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ABSTRACT

This annual listing of research in mathematics education contains annotated citations of research papers and monographs dated January 1997 through March 1998 and abstracted for the ERIC database. Journal articles focusing on the interpretation and implications of mathematics education research are also featured. An index of dissertations by institution and a list of journals searched are also included. (WRM)

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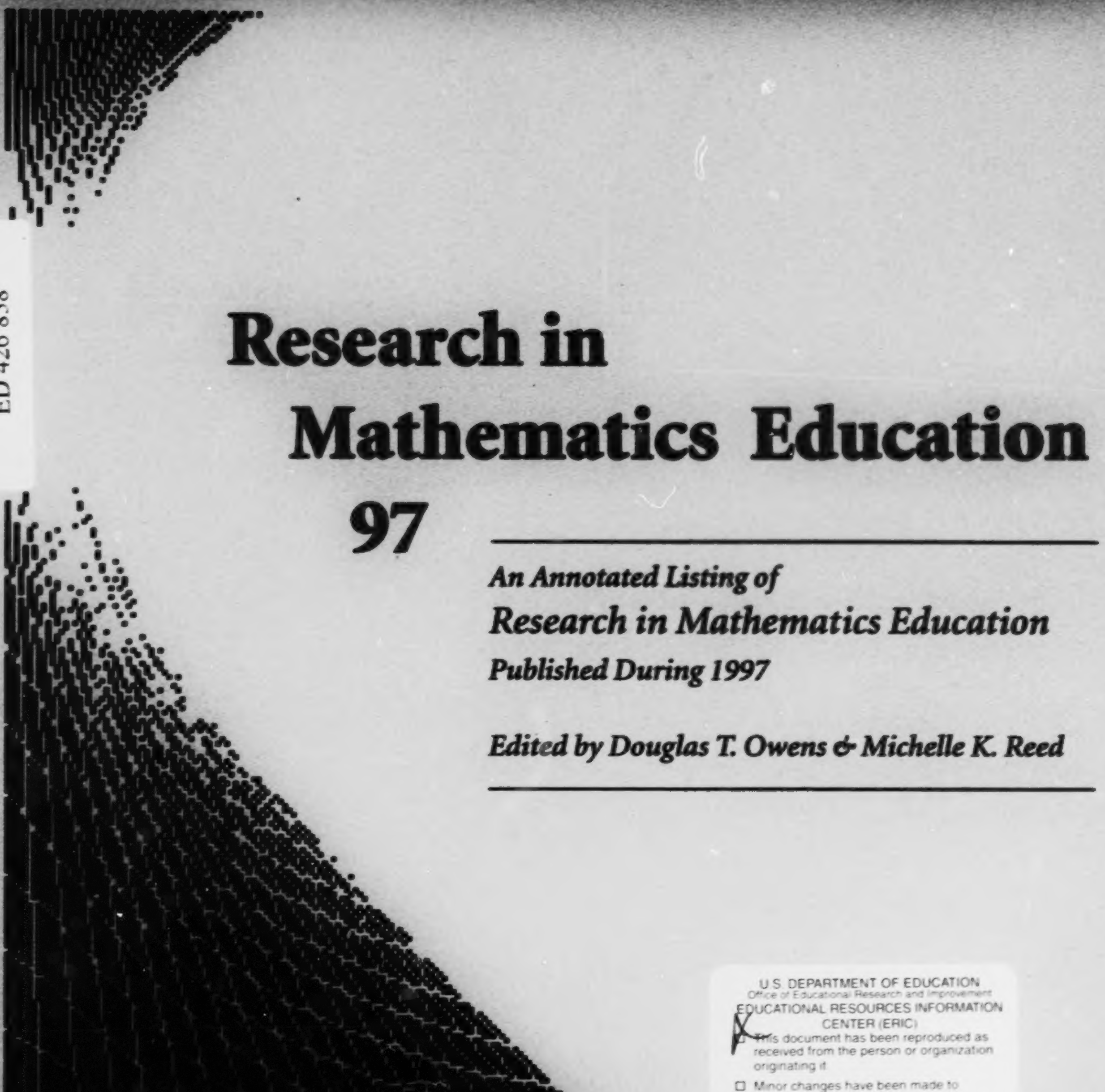

Research in Mathematics Education

97

An Annotated Listing of

Research in Mathematics Education

Published During 1997

Edited by Douglas T. Owens & Michelle K. Reed

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RESEARCH IN MATHEMATICS EDUCATION
1997

Edited by

Douglas T. Owens
Michelle K. Reed

Produced by
ERIC Clearinghouse for Science, Mathematics,
and Environmental Education

1998

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PREFACE

The annual listing of research in mathematics education for many years was published as an issue of the Journal for Research in Mathematics Education, a publication of the National Council of Teachers of Mathematics. Two annual research listings for 1994 and 1995 were prepared by the ERIC Clearinghouse for Science, Mathematics, and Environmental Education (ERIC/CSMEE) with the financial support of NCTM. This is the second annual research listing prepared solely by ERIC/CSMEE.

This version is very similar to the last three versions listing the research reported in 1994 , 1995 and in 1996. Each entry has been classified with ***Major*** and *Minor* codes and all entries are indexed by ***Major*** codes. Dissertation Abstracts which appeared in *Dissertation Abstracts International* during 1997 have been listed. Journal articles reporting research, as well as journal articles focusing on the interpretation and implications of research, have been included. Papers and monographs dated 1997 and abstracted for the ERIC database by the end of March 1998 are recorded. An index of dissertations by institution is provided. A list of journals cited is included.

As much as mathematics educators have valued the research listing in the past, with electronic databases becoming increasingly accessible, it is not clear in what format(s) future listings would be most useful. Though ERIC/CSMEE has the capacity to produce this listing, it is not clear the extent to which a single annotated listing of mathematics education research is still valued by the mathematics education community. We earnestly request feedback from you our reader, either in writing or by e-mail at the addresses listed below. This listing will become available through the ERIC/CSMEE World Wide Web site.

We sincerely hope you find this listing useful. *Again, we solicit your comments and recommendations.* You may contact ERIC/CSMEE by mail, ERIC Clearinghouse for Science, Mathematics and Environmental Education, 1929 Kenny Road, Columbus, OH 43210-1080; or by e-mail to ericse@osu.edu.

D.T.O.
M.K.R.

Key to Codes

The following topic codes have been used to indicate the major and minor emphases of each dissertation, journal article, and paper in this listing. Each entry has been assigned a minimum of one and a maximum of three major codes, and any number of minor codes. The combined topic index at the end of the volume reflects only major codes, with entries listed in 18 clusters of related topics.

The grade level or educational level of each study is indicated in parentheses after the topic codes. Please note that studies related to preservice or inservice teacher education are so indicated by the appropriate topic codes (Prsv, Insv). The level designated on teacher education studies refers to the grade level(s) at which the intern or teacher participants teach. Teachers as subjects were preceded with a level code. For example elementary school teachers were coded EL,TE. Teacher education students preparing to teach at the elemtentary level were coded TE,EL, for example.

Topic Codes

Code	Definition
Ach	Achievement
A/S	Addition, subtraction
AdvM	Post-calculus mathematics
Aff	Affect
Alg	Algebra, pre-algebra
Anx	Anxiety (student's)
Arth	Arithmetic
Assm	Assessment, evaluation
Att	Attitudes (student's)
Blf	Beliefs (student's)
Calc	Calculus, precalculus
Cltr	Calculators (general)
ClIn	Classroom interaction
Comm	Communication
CAI	Computer-assisted instruction
Comp	Computers (general)
CC	Cross-cultural studies
Curr	Curriculum, programs
Decm	Decimals
D/R	Diagnosis, remedial mathematics
DscM	Discrete mathematics
Eqv	Equivalence, proportions
Est	Estimation
Eqty	Equity
Ethn	Ethnic, racial, cultural
Frac	Fractions, rational numbers
Gend	Gender differences
Geom	Geometry
Gift	Gifted (students)
GCal	Graphing calculators
Grpg	Grouping for instruction, cooperative learning
Impl	Implications of research, interpretations of research
Insv	Inservice teacher education, professional development
Int	Integers
IC	Integrated curriculum
Knw	Knowledge (student's)
Lang	Language, psycholinguistics
Lrnr	Learners (characteristics of)
LD	Learning disabled
Lrng	Learning, learning theories, cognitive development, constructivism
Styl	Learning style, cognitive style
Manp	Manipulatives
Matl	Materials (texts, other resources)
Meas	Measurement
Mscn	Misconceptions
M/D	Multiplication, division
M/CBL	Microcomputer/calculator based laboratory
MMed	Multimedia
Mtcg	Metacognition, reflection
NSns	Number sense
PlcV	Place value, numeration
Oral	Oral communication, classroom discourse
Patt	Patterns, relationships, math connections
RaPc	Ratio, proportion, percent
Pers	Personality
Phil	Philosophy, epistemology
Plan	Planning, descision making
Prob	Probability
PS	Problem solving, reasoning
Prsv	Preservice teacher education
Prf	Proof, justification
RaPc	Ratio, proportion, percent
Rep	Representations, modelling
Rsch	Research issues, methods
Revw	Reviews of research
Soc	Social factors, context, parents
Vis	Spatial visualization
Stat	Statistics
TAnx	Anxiety (teacher's)
TAtt	Attitudes (teacher's)
TBlf	Beliefs (teacher's)
TKnw	Content knowledge (teacher's), pedagogical knowledge
Tchr	Teachers (characteristics of)
Tchg	Teaching (role, style, methods)
Tech	Technology (general)
Whol	Whole numbers
Writ	Writing, journals

Level Codes

EC	Early childhood, K-4	EL	Elementary, K-8
MS	Middle grades, 5-8	SE	Secondary, 5-12
HS	High school, 9-12	K-12	All school levels
PS	Post secondary, 13+	ALL	All student levels
TE	Teacher education, teachers		

Dissertation Research in Mathematics Education Reported in 1997

James D. Atkinson, Kelly M. Costner, Marlena F. Herman, & Michelle K. Reed
The Ohio State University

This section lists 384 dissertations in mathematics education research that were abstracted in *Dissertation Abstracts International* during 1997. Each entry is coded (see Key to Codes) with one to three **major** topic codes (in bold type) and any number of *minor* topic codes, as well as the grade level code (in parentheses). Studies related to preservice or inservice teacher education are indicated by the appropriate topic codes (Prsv.Insv). The level designated for teacher education or teacher studies indicates the grade level(s) at which the intern or teacher participants teach, followed by the level code, "T" for teacher or "TE" for teacher education. All entries are indexed by major codes at the end of the volume (see page 85). An index of dissertations by institutions is included at the end of this section (see page 27).

Addington, Duard G. (1996). *Effects of parental involvement on mathematics achievement at eighth, tenth, and twelfth grades* (Virginia Polytechnic Institute and State University). DAI-A 57(11), p. 4677, May 1997. [AAT 9710939]

Study of the data from the 1988 National Educational Longitudinal Study and followups found parental involvement in students' academic lives was a powerful influence on student mathematics achievement at eighth-, tenth-, and twelfth grades.

Ach, Soc (SE)

Alexander, Allen H. (1996). *Determining the effects of remedial mathematics education in a community college* (University of Delaware). DAI-A 58(05), p. 1556, Nov 1997. [AAT 9733550]

Although this case study indicated that remedial education was ineffective and that therefore an open admission policy is unjustified, the conclusion is considered tentative. Missing, incomplete, and inaccurate data diminished the utility of the college's information system.

D/R, Plan (PS)

Alidou, Hassana. (1997). *Education language policy and bilingual education: The impact of French language policy in primary education in Niger* (University of Illinois at Urbana - Champaign). DAI-A 58(06), p. 2036, Dec 1997. [AAT 9737030]

Students' poor performance on achievement and proficiency tests in language and two content areas (including mathematics) suggests that there are serious problems related to teaching and testing methods currently utilized in Nigeria.

Lang, Ach (EC)

Alon, Sandra. (1997). *The meaning that elementary teachers attribute to the concept of the equal sign* (Columbia University Teachers College). DAI-A 58(05), p. 1627, Nov 1997. [AAT 9734041]

A substantial majority of elementary and preservice teachers (n=94) viewed "=" as a symbol associated with an operation rather than a relational symbol between two expressions. Views of "=" as relational were unstable.

TKnw, Prsv, Mscn (EL, TE)

Altman, Janice Hegeman. (1997). *The relative contribution of antecedent sources to math self-efficacy* (University of Illinois at Urbana - Champaign). DAI-B 57(12), p. 5046, Jun 1997. [AAT 9732496]

Data from community college students (n=364) showed that women reported significantly weaker self-efficacy expectations than men.

Att, Gend (PS)

Armstrong, Kelli Jean. (1996). *Women in science and mathematics: First year perceptions of college learning experiences and the effect on persistence* (Boston College). DAI-A 57(09), p. 3838, Mar 1997. [AAT 9706656]

Questionnaires of (n=133) women about their experiences in college mathematics and science and their persistance in majoring in the subjects found non-persisters were far more likely to choose pedagogical reasons as significant factors in their reason for leaving and were less likely to experience faculty contact outside the classroom.

Gend, Blf (PS)

Arnold Joy, Judith E. (1996). *A study to determine the effects of direct parental involvement on students' mathematic achievement in grades three through five* (Wayne State University). DAI-A 57(12), p. 5053, Jun 1997. [AAT 9715857]

Direct parental training in the area of at-home computational activities was compared to at-home activities without training and to a control group. Parental involvement was found to significantly affect the achievement of students in one of the three grade levels studied as was keeping a log book. Relationships were found between gender and engagement.

Soc, Ach, Arth, Gend (EL)

Arthurs, Edna Marie. (1996). *Mathematical problem solving: The effects of tuning students' attention to information on the key idea of a problem on their mathematical performance* (The University of Connecticut). DAI-A 57(09), p. 3860, Mar 1997. [AAT 9703685]

A group of sixth graders participating in a three-day activity of the videodisc adventure series, The Adventures of Jasper Woodbury, were separated into one group taught to tune their attention to information on key ideas of the problem and another group without such teaching. The experimental group scored significantly higher on some problems.

PS, Comp (MS)

Ashley, David Ira. (1996). *How different cultures impacted one teacher's beliefs in teaching mathematics* (The Florida State University). DAI-A 57(08), p. 3433, Feb 1997. [AAT 9700200]

A case study of one high school mathematics teacher found she held isolated clusters of beliefs unique to each of the two different social and mathematical cultures at her school.

Ethn, TBlf (HS, T)

Atkinson, Suzan. (1995). *An action research investigation into mathematics curriculum development and the role of mathematics co-ordinator in a primary school* (Open University). DAI-C 58(03), p. 766, Fall 1997.

This thesis describes an action research investigation into curriculum development in mathematics and the role of the mathathematics co-ordinator in a large inner city model primary school in the late 1980's.

Curr, Tchr (EL, T)

Balli, Sandra J. (1995). *The effects of differential prompts on family involvement with middle-grades homework* (University of Missouri - Columbia). DAI-A 57(09), p. 3861, Mar 1997. [AAT 9705321]

Random assignment of (n=74) sixth-grade students to groups with either prompting or no prompting to involve students' families in homework found the familites in the prompting groups were significantly more involved with mathematics homework.

Soc (MS)

Barbera Gregori, Elena. (1995). *Assessment approach in mathematics: Procedural and strategic knowledge in written assessment programs in mathematics* (Universitat De Barcelona). DAI-C 58(02), p. 330, Sum 1997.

Interviews of primary teachers and their students from three types of schools (traditional, innovative, and reformist) regarding assessment approaches found regularities shared by most of the teachers independently belonging to one or other kind of school.

Assm, Tchg, Writ (EL, T)

Bass, Daniel Thornton. (1996). *Mathematical intuition and the secondary student* (Auburn University). DAI-A 57(10), p. 4297, Apr 1997. [AAT 9709121]

Questionnaires describing mathematical or physical science situations were given to (n=207) advanced mathematics secondary school students in order to analyze fallacies incurred by false intution.

Styl, Mscn (SE)

Beauford, Judith Elaine Mitchell. (1996). *A case study of adult learners' metacognitive strategies in factoring polynomials over the integers* (The University of Texas at Austin). DAI-A 57(09), p. 3861, Mar 1997. [AAT 9705787]

This exploratory investigation observed the metacognitive strategies of adult learners in a developmental algebra class as they learned a new cognitive skill—factoring polynomials over the integers. A statistically significant relationship was found between their prediction of success and the accuracy of their answers.

Mtcg, Alg (PS)

Belongia, Cynthia Medeiros. (1996). *A cross-site analysis of the extent of implementation of the California mathematics and science frameworks* (University of Southern California). DAI-A 57(09), p. 3755, Mar 1997. [AAT 9705072]

The study found that the strongest perceived implementation of the frameworks was in content at the district level for both mathematics and science. Technology was perceived as needing further implementation in both disciplines.

Curr, Tech (K-12)

Benson, Christine Corrigan. (1997). *Assessment and instructional practices of secondary mathematics teachers who participated in Project Extra: A case study* (University of Missouri - Kansas City). DAI-A 58(03), p. 783, Sep 1997. [AAT 9726184]

Teachers (n=32) knowledge of assessment increased and teachers were more confident in their expertise as assessors, although their mathematics curricula lacked significant depth.

Assm, Insv (SE, T)

Bills, Elizabeth J. (1997). *Shifting sands: Students' understanding of the roles of variables in 'A' level mathematics* (Open University). DAI-C 58(04), p. 1155, Win 1997.

Qualitative data was drawn chiefly from a year of teaching and observing two mathematics classes in England and Wales. Among those topics studied was the relationship of understanding of variables to problem solving.

Alg, Curr, PS (SE)

Bissey, Nancy R. (1996). *Probabilistic reasoning based on age of students and context of questions* (University of Missouri - Columbia). DAI-A 58(06), p. 2117, Dec 1997. [AAT 9737862]

Sixth-, ninth-, and twelfth-grade students (n=26) were interviewed using open-ended questions. Analysis of the responses indidcated that the age of the students did not affect their success in formulating an appropriate strategy for solving the problems, but there were significant differences in probabilistic reasoning when examined by context (artificial vs. real-world).

Prob, PS (SE)

Boggs, Gordon L. (1997). *Effects of a developmental mathematics program on the academic achievement of underprepared college students* (The University of Alabama). DAI-A 58(06), p. 2118, Dec 1997. [AAT 9735679]

Community college students (n=2208) enrolled over a seven-year period were studied. No signficant differences in the passing rate in credit-level mathematics between developmental and non-developmental students were found. Remediated students attended college significantly longer.

D/R, Ach (PS)

Bonn, Kathleen Louise. (1996). *Factors affecting women's decisions to pursue graduate degrees in mathematics: A multiple case study* (Indiana University). DAI-A 57(07), p. 2922, Jan 1997. [AAT 9640106]

Focus groups with (n=7) senior female mathematics majors regarding their decisions about whether or not to continue on to graduate mathematics study found three factors affecting their decisions: confidence in their ability to do graduate-level mathematics, preceived usefulness of a graduate mathematics degree, and enjoyment in mathematics.

Gend, Lrnr (PS)

Bosch I Casabo, Marianna. (1994). *The ostentive dimension in mathematical activity: The example of proportionality* (Universitat Autonoma De Barcelona). DAI-C 58(02), p. 330, Sum 1997.

This work considers the analysis of mathematical activity as the first step in the study of didactic phenomena. More specifically, it refers to the Anthropological Approach of Didactics in which both mathematics and its teaching and learning are regarded as one type of human activity among many. An experiment is presented in which a group of (n=40) mathematicians and students solve elemental problems.

RaPc, Phil, PS (PS)

Brown, Angela Denise Humphrey. (1997). *Making the invisible visible by challenging the myth of the universal teacher: African-American women postsecondary mathematics teachers* (University of Georgia). DAI-A 58(06), p. 2023, Dec 1997. [AAT 9735473]

Seven teachers from community colleges or technical schools were studied. The race and gender of these teachers affected their teaching-learning environment. Their teaching practices focused on accessibility, equity, and the empowerment of learners.

Ethn, Gend, Eqty (PS)

Buerger, Jane Ruth. (1997). *A study of the effect of exploratory writing activities on student success in mathematical problem solving* (Columbia University). DAI-A 58(03), p. 783, Sep 1997. [AAT 9728160]

An experimental and control group from a liberal arts college math course participated. Students in the experimental (writing) group showed significantly higher mastery of course content and proficiency in algebraic skills, as well as improved beliefs about the nature of math as a discipline.

Writ, PS, Blf, Knw, Att (PS)

Burke, Joan Marilyn. (1997). *An investigation of trends in K-12 mathematics curriculum development process as perceived by chief administrators in New Jersey public schools* (Seton Hall University). DAI-A 58(03), p. 784, Sep 1997. [AAT 9724523]

Responses to a thirteen-item questionnaire were received from 272 school districts. Ninety-four percent of the districts indicated a revision in their mathematics curriculum in the past five years.

Curr (K-12)

Burton, Beatrice Spencer. (1995). *The effects of computer-assisted instruction and other selected variables on the academic performance of adult students in mathematics and reading* (Grambling State University). DAI-A 57(07), p. 2798, Jan 1997. [AAT 9639904]

Scores on the mathematics and reading sections of the Test of Adult Basic Education were significantly different for (n=200) adult students using computer-assisted instruction versus those involved in traditional instruction. Ethnicity also had some influence on scores.

CAI, Ethn (PS)

Caldwell, Jennifer Christine. (1996). *College students with a disability attempting science, engineering, or mathematics studies: Fourteen case studies* (University of Illinois at Urbana - Champaign). DAI-A 57(11), p. 4634, May 1997. [AAT 9712211]

Interviews with (n=14) college students with a vision, hearing, or motor impairment majoring in science, engineering, or mathematics programs showed two commonalities: all were mainstreamed into regular schools—although many were originally denied access, and all had been undergoing an intensive search for answers regarding disability and beyond.

Aff, Lrnr (PS)

Camacho, Maria Guadalupe Moreno. (1997). *The use of reflective teaching with seventh-grade language minority students in an urban classroom setting* (Texas A&M University - Kingsville). DAI-A 58(06), p. 2037, Dec 1997. [AAT 9736990]

The teacher/researcher of this study used student evaluations of lessons to adjust activities based on the student reflection comments. Minority students seemed to have a higher percentage of approval than other students.

Tchg, Ethn (SE, T)

Case, Lisa Pericola. (1997). *Mathematical understandings: How students with learning difficulties progress in a constructivist classroom* (University of Maryland, College Park). DAI-A 58(06), p. 2158, Dec 1997. [AAT 9736534]

Six students and their teacher within a heterogeneous third grade classroom were the focus participants in the study. Important relationships between students' learning and their role in the classroom community, the methods of instruction, and the influence of relationships outside the classroom are discussed.

LD, Lrng (EC)

Chen, Guangzhoug. (1996). *A comparative study of attitudes toward mathematics between selected Chinese high school students and United States high school students* (The University of Toledo). DAI-A 57(09), p. 3861, Mar 1997. [AAT 9705647]

Study of (n=129) U.S. and (n=130) Chinese high school students found that Chinese students more highly valued the topics and activities included in the school mathematics curriculum, and perceived higher expectations and more support in mathematics study from parents. U.S. students felt more confident in their mathematics ability and had less mathematics anxiety. Female students held attitudes toward mathematics as positive as the males.

CC, Att, Gend (HS)

Chirwa, Andrew Shemu. (1996). *Computers stimulate the generation of questions among students* (University of Illinois at Urbana - Champaign). DAI-A 57(08), p. 3464, Feb 1997. [AAT 9702478]

This study investigated the use of two algebra I classroom environments: textbook and computer. Results indicated that students in the CAI-Algebra Environment asked more questions than students in the TXT-Algebra Environment on the four combined categories of high-level and low-level subject matter questions to teacher and to student.

Comp, Alg (HS)

Choi, Sang Sook. (1996). *Students' learning of geometry using computer software as a tool: Three case studies* (University of Georgia). DAI-A 58(02), p. 406, Aug 1997. [AAT 9722455]

Qualitiative study of the use of a dynamic computer software tool with secondary students found four learning states which were hierarchical and played the role of a bridge between the van Hiele levels of geomtric thought. There also was consistency between the van Hiele levels of geometric thought and students' problem-solving ability.

Geom, Comp, PS (SE)

Clark, Perry Joseph. (1997). *Predicting performance on the ninth grade math Ohio proficiency test* (Kent State University). DAI-58(03), p. 734, Sep 1997. [AAT 9728039]

Students who had initially failed the test were studied to determine variables that differentiated between those who eventually passed and those who never passed. An equation consisting of six variables was found to predict the pass/fail outcome at a rate of 92% accuracy.

Assm, Ach, Ethn, Gend (HS)

Conger, Karen I. (1996). *A content analysis study of Portable Assisted Study Sequence mathematics curricular materials for migrant students using the National Council of Teachers of Mathematics Standards* (Walden University). DAI-A 57(09), p. 3794, Mar 1997. [AAT 9705725]

An evaluative instrument was designed to measure the extent to which reform ideas were represented in the curricular materials. P.A.S.S. materials from 1995 were found to be measurably improved upon similar materials from 1989.

Curr, Ethn (K-12)

Contreras De La Fuente, Angel. (1994). *Evolution of conceptions about elementary geometrical notions in Logo programming environments* (Universidad De Granada). DAI-C 58(03), p. 767, Fall 1997.

This research studied the incidence of computer programming activities in Logo, based on the learning of elementary geometrical notions. Programming in Logo in geometry lessons produced a positive effect on the geometrical concepts of students.

Comp, Geom (HS)

Cooper, Judith M. (1996). *Stages of concern of mathematics teachers regarding the Curriculum and Evaluation Standards for School Mathematics* (George Mason University). DAI-A 57(10), p. 4246, Apr 1997. [AAT 9709082]

Questionnaires regarding the concerns, knowledge levels, and instruction and training needs of (n=320) K-8 mathematics teachers with reference to the implementation of the NCTM standards found that these teachers were typical nonusers of the Standards, but have a general understanding of problem solving as described in the Standards.

Curr, TAtt (EL, T)

Cossey, Ruth. (1997). *Mathematical communication: Issues of access and equity* (Stanford University). DAI-A 58(02), p. 406, Aug 1997. [AAT 9723342]

Relationships between seventh and eighth grade students' informal classroom conversations while in small work groups and their subsequent formal written accounts of their mathematical understandings were investigated. Regression analysis indicated that an individual's presence at high-quality conversations affects the production of written communication.

Comm, Eqty, Grpg, Writ (MS)

Coulombe, Wendy Noel. (1997). *First year algebra students' thinking about covariation* (North Carolina State University). DAI-A 58(06), p. 2118, Dec 1997. [AAT 9736819]

Students in grades 8 and 9 (n>100) had rather fragile and unstable ideas of covariance, but they did have an intuitive notion for multiple patterns of covariation. Three levels of student thinking are identified as students' understanding of covariation matures.

Alg, Lrng (SE)

Croft, William Earl. (1997). *Attitude of college-level electronics technology majors toward mathematics* (Indiana University). DAI-A 58(03), p. 784, Sep 1997. [AAT 9727923]

Students surveyed (n=148) had positive attitudes in the areas of confidence, usefulness, and anxiety. Attributions for success in electronics or mathematics varied, but students agreed that teacher explanations were important.

Att, Tech, Aff, Anx (PS)

Culbertson, William Loren. (1997). *Improving predictive accuracy for placement in entry level college mathematics courses using available student information* (University of Toledo). DAI-A 58(02), p. 395, Aug 1997. [AAT 9721041]

Logistic regression and chi square tests were applied to students enrolled in developmental mathematics at a community college (n=584). Results showed little predictive accuracy of achievement in current college placement practices. The analysis could be used to make "probability of passing" forecasts for students and advisors.

Assm, D/R, Ach (PS)

Curtis, Shirley A. (1997). *Various levels of representation: Parents assisting children with mathematics homework* (University of Cincinnati). DAI-A 58(05), p. 1627, Nov 1997. [AAT 9734591]

Ethnographic techniques of participant observation were employed to investigate a family of five for 21 months. After tutoring by the researcher, a better match was found between parents' and childrens' levels of representation, as formulated by Bruner.

Soc, Rep, PS, Lrng (EL)

Cyrus, Kenneth R. (1996). *Causal explanations for mathematics performance given by low socioeconomic status African-American mothers and their children* (University of Florida). DAI-A 57(09), p. 3809, Mar 1997. [AAT 9703533]

Study of attributional beliefs of low SES African American mothers and their sixth-, seventh-, and eighth- grade children showed that mothers and children generally explained the children's mathematics success as a result of effort. For mathematics failure, mothers emphasized lack of effort, whereas children emphasized lack of home training and lack of effort.

Ethn, Soc, Blf (MS)

Dance, Rosalie Ann Moore. (1997). *A characterization of aspects of the culture of a successful mathematics classroom in an inner city school* (University of Maryland, College Park). DAI-A 58(06), p. 2118, Dec 1997. [AAT 9736547]

Evidence from observation and interviews suggested that an atmosphere of challenge, a sense of community, and the patterns of interaction among members of the classroom interacted to affect students' responses to the study of mathematics.

Soc, Clln, Grpg (SE)

Darrow, Jeffrey Richmond. (1997). *Revitalizing the curriculum: Using original sources, history, and writing in undergraduate mathematics* (Idaho State University). DAI-A 58(05), p. 1627, Nov 1997. [AAT 9734214]

Textbooks, work of individual researchers, and institutions that have implemented these reforms are surveyed. The author's own attempts at integrating history and writing in calculus and other courses are also described, and two instructional units written by the author are included.

Curr, Writ, Calc, AdvM (PS)

Eilers, Linda Hale. (1996). *The effects of analytic reading skills on sixth graders' ability to solve mathematical story problems* (The Louisiana State University and Agricultural and Mechanical College). DAI-A 57(07), p. 2865, Jan 1997. [AAT 9637770]

Instruction in the use of graphic organizers in conjunction with analytic reading skills resulted in significantly higher adjusted post-mean scores for sixth graders when compared to the group that received no treatment.

PS, IC (MS)

Elliott, Pamela Ruth. (1996). *A multilevel model of mathematics achievement: Its use for validation of education indicators* (University of Delaware). DAI-A 57(09), p. 3862, Mar 1997. [AAT 9703948]

Multilevel structural equation modeling was applied to a subsample of students from the first follow-up study of the National Education Longitudinal Study of 1988. Indicators affecting student learning of one skill level were found to not necessarily have the same effect on learning other skill levels.

Ach, Assm (ALL)

Fagbeyiro, Gabriel O. (1995). *The effects of learner characteristics and computer feedback strategies on learning achievement of developmental students in familiar and unfamiliar mathematics lessons* (Grambling State University). DAI-A 57(07), p. 2830, Jan 1997. [AAT 9639905]

An investigation of types of computer feedback strategies found significant interaction effects between learner characteristics and feedback strategies. Individual ability and locus of control were found to have substantial effects on learning achievement.

Lrnr, Comp, Arth (PS)

Flory, Maurene Danielle. (1997). *Negotiating cultural inclusion: American Indian students respond to a mathematics reform* (University of Colorado at Boulder). DAI-A 58(03), p. 705, Sep 1997. [AAT 9725728]

Group work and cultural markers were incorporated in an effort to increase academic success and retention rates. Contextualized problems appeared to motivate culturally connected American Indian students. Teachers were placed in the position of having to legitimate (or not) minority cultural knowledge.

Ethn, Curr, Ach, Grpg (HS)

Forbes, Cymbelene Ann. (1997). *Analyzing the growth of the critical thinking skills of college calculus students* (Iowa State University). DAI-A 58(06), p. 2101, Dec 1997. [AAT 9737709]

Active learning environments were compared to passive ones (n not given). Growth in subjects' critical thinking skills did not occur in the predicted direction. These findings may not detract from the ecological validity of the study.

Calc, PS, Curr (PS)

Ford, Jack Seymour. (1994). *Development of a model for first year algebra instruction: The principal's role in implementation* (Indiana State University). DAI-A 57(09), p. 3761, Mar 1997. [AAT 9703893]

Extended time for study (three semesters instead of two) and implementation of a mastery learning concept proved effective. The principal's role as leader was emphasized.

Alg, Lrng (HS)

Garrison, Joseph Lowell. (1997). *The evaluation of a probabilistic intuition supplement to the secondary mathematics curriculum* (Georgia State University). DAI-A 58(04), p. 1226, Oct 1997. [AAT 9731173]

A treatment group (n=75) that received the supplement significantly outscored a control group (n=75) on an intuition posttest, probability test, and statistics test. Treatment students interviewed were found to have a more sophisticated understanding of posttest questions than control students (n=12).

Prob, Knw, Stat (SE)

Goldsby, Dianne Simpson. (1994). *The effect of algebra tile use on the polynomial factoring ability of algebra I students* (University of New Orleans). DAI-A 57(08), p. 3434, Feb 1997. [AAT 9701573]

Instruction incorporating algebra tiles resulted in higher scores than traditional instruction (teacher explanation) alone (n=247). Higher scores were seen in terms of common factors, correct selection and placement of signs, exponents, and application to equations.

Alg, Manp (HS)

Good, Beverly A. (1996). *Characteristics of science and mathematics integration: Activities recommended in teachers' manuals for four elementary science textbooks series* (The Ohio State University). DAI-A 57(10), p. 4202, Apr 1997. [AAT 9710567]

Activities recommended to integrate science and mathematics were found to be optional and, relative to other optional activities, occurred infrequently. Only two process-oriented characteristics, collecting and organizing data and interpreting data, were adequately represented in the manuals.

IC, Matl, Stat (EL)

Grant, Pamela Stroope. (1996). *Characteristics of community college mathematics remediation programs* (Texas A&M University - Commerce). DAI-A 58(03), p. 765, Sep 1997. [AAT 9724613]

Analysis of standardized test scores showed that: (a) low passing percentages for all ethnic groups who received remediation suggest a need for additional strategies; (b) remedial students who passed the pretest did not show gains in the posttest; and (c) self-paced learning modules, writing activities, group techniques, and manipulatives were identified as potentially beneficial strategies.

D/R, Ethn (PS)

Gregory, Lorraine. (1997). *Why mathematics as communication is important and how it is utilized in the teaching and learning of mathematics* (Duquesne University). MAI 35(04), p. 937, Aug 1997. [AAT 1384119]

Mathematics teachers were surveyed to determine the extent to which communication activities were being used and which ones were most favored. Writing and reading activities were used less frequently and rated lower.

Comm, Writ, TAtt (T)

Gupta, Barbara Mackay. (1996). *Constructing connections: Children building their conception of equality into their interpretation of the equal sign* (Washington State University). DAI-A 58(04), p. 1226, Oct 1997. [AAT 9731093]

In Phase I, second grade students demonstrated that they had no connections between the equal sign and the conception of equality. In Phase II, a teaching experiment helped students to incorporate conceptions of equality into their descriptions of the equal sign, and helped them restructure their knowledge by connecting their conceptions with the symbol.

Patt, Mscn, Lang (EC)

Hall, Craig Richard. (1996). *Differential effects of prediction versus reading in support of learning from a computer-based conceptual model* (The Florida State University). DAI-A 57(11), p. 4647, May 1997. [AAT 9712149]

The strategy of making predictions before using a computer simulation was found not to influence achievement on statistics concepts. There was also no significant relationship between the amount of manipulation of the computer simulations and achievement (n=48).

Comp, Stat (PS)

Hammill, Lin Louise. (1996). *A comparative study of problem-solving behaviours of average college algebra students working alone and in dyads* (Simon Fraser University). DAI-A 58(05), p. 1628, Nov 1997. [AAT NN16907]

Although pairs of students tended not to discuss problem structure or analyze potential strategies, pairs were still more successful in solving a given set of problems than students who worked alone. Increased success of pairs was due to increased persistence, leadership by the more able partner, increased oral rehearsal, and correction of minor errors.

PS, Grpg, Alg (PS)

Harris, Mary Ann Stratford. (1996). *The effects of block scheduling on Alabama end of course algebra scores, attendance, and discipline* (The University of Alabama). DAI-A 58(03), p. 666, Sep 1997. [AAT 9726107]

One high school using block scheduling and one using traditional scheduling were compared. There were no significant differences on test scores or teacher attendance, but student attendance did increase and discipline problems did decrease under the block schedule.

Ach, Soc, Alg (HS)

Hayden, Michael Barry. (1996). *Newton: An interactive environment for exploring mathematics* (University of Rhode Island). DAI-A 57(08), p. 3434, Feb 1997. [AAT 9702092]

The design, implementation, and evolution of a computational environment for teaching introductory mathematics (N scEWTON), an interface to a computer algebra system, is discussed.

CAI (PS)

Heath, Panagiota (Penney). (1995). *The effectiveness of using Daily Instructional Resource Forms to implement the NCTM Standards through writing in college mathematics* (University of New Orleans). DAI-A 57(12), p. 5089, Jun 1997. [AAT 9717078]

Quantitative data showed that forms designed to organize student note-taking improved students' test performance in a precalculus class in functions and in graphs. Qualitative data showed that the forms promote good note-taking, and encourage students to be actively involved in constructing mathematical knowledge.

Writ, Matl (PS)

Henderson, Betty Kell. (1996). *An evaluation of the use of UCSMP materials in a mathematics program* (Kansas State University). DAI-A 57(11), p. 4637, May 1997. [AAT 9714356]

An overall program evaluation of UCSMP materials included quantitative and qualitative data from teachers, principals, district administrators, and school board members. Central administration expressed a need for leadership from teachers on developments in mathematics education, while teachers expressed concern about low evaluations from administrators who did not understand the new directions in mathematics education.

Curr, TBlf (K-12, T)

Henriques, Barbara Delphine. (1997). *In their own voice: a study of preservice early childhood and elementary teachers reconstructing their beliefs about teaching and learning mathematics* (University of Massachusetts). DAI-A 58(02), p. 406, Aug 1997. [AAT 9721457]

Interpretive analysis of qualitative data revealed five major themes: preservice teachers' prior beliefs and experiences; increased understandings about themselves as learners of mathematics; new learning about mathematical pedagogy; new or different ways of learning mathematics; and anger about their previous mathematics experiences.

TBlf, Prsv, Lrng (EL, TE)

Hooper, Jennifer Jean. (1996). *Students' concepts of rational functions as developed in a computer graphing environment* (University of Georgia). DAI-A 57(09), p. 3862, Mar 1997. [AAT 9636449]

Students (n=27) used software and guided discovery lessons to investigate rational functions for 3 days. Findings include: students did not naturally see asymptotes, they became better at symbolization than graphing, they did not develop generalized procedures, and they tended to create concept definitions according to concept images and visual reasoning.

CAI, Alg (PS)

Howard, Keary James. (1997). *The effect of context in college students' solutions of mathematics word problems* (Cornell University). DAI-A 57(12), p. 5089, Jun 1997. [AAT 9716093]

Students (n=59) were found to score higher on contextual than on procedural problems when both had difficult solutions, and they scored higher on procedural than on contextual problems when both had easy solutions. They used a greater number of nonalgorithmic solutions on contextual problems. In general, students did not prefer procedural problems over contextual problems.

PS, Rep (PS)

Hughes, Linda Lou Mahoney. (1996). *Describing the alignment between instructional materials and assessment: A content comparison between elementary mathematics textbooks and proficiency assessment instruments* (East Texas State University). DAI-A 57(07), p. 2924, Jan 1997. [AAT 9638436]

Results showed that fourth grade textbooks were similar to proficiency assessments, but eighth grade textbooks were significantly different from proficiency assessments, and implied a need for alignment between textbooks and assessment instruments.

Matl, Assm (EL)

Irwin, Kathryn Cressey. (1997). *Using context to enhance students' understanding of decimal fractions* (University of Auckland). DAI-A 58(05), p. 1629, Nov 1997. [AAT 9733788]

A pretest and posttest of students (n=84) aged 11 to 12 showed they gained more understanding from contextualized problems on decimal fractions than on purely numerical problems. Much of their learning seemed to result from reconsidering their views after a conflict between expectations and results.

Decm, Rep, Lrng (MS)

Johnson, Thomas K. (1996). *Applied mathematics in selected 1993 Mississippi tech prep sites* (The University of Southern Mississippi). DAI-A 57(10), p. 4248, Apr 1997. [AAT 9708962]

Students who made less than a B in their previous mathematics course and (n=29) were taught using modules of the CORD Applied Mathematics program scored lower on a state algebra 1 test than did (n=70) students who were taught traditionally.

Alg, Curr, Gend, Ethn (HS)

Jong, Jyh-Tsorng. (1997). *Parents and kindergartners: Money and number, practices, concepts and skills* (Iowa State University). DAI-A 58(03), p. 730, Sep 1997. [AAT 9725420]

Kindergartners' (n=207) use of money was influenced by their number concepts and knowledge of coins' names and values. No relationship was found between parents' number practices and kindergartners' number learning, nor between parents' monetary practices and kindergartners' monetary use.

Soc, NSns (EC)

Kang, Henry. (1996). *Preservice teachers' beliefs and conceptions of mathematics learning and teaching* (The University of Regina). MAI 35(03), p. 645, Jun 1997. [AAT MM14570]

Field data and interviews were used to explore (n=2) preservice teachers' experiences with mathematics. Results suggest that teacher education should provide opportunity for preservice teachers to deconstruct negative beliefs, and should provide an environment in which preservice teachers can practice positive views of (and alternative methods of) teaching mathematics.

TBlf, Prsv (TE)

Keck, Heidi Latvala. (1996). *The development of an analytic scoring scale to assess mathematical modeling projects* (University of Montana). DAI-A 57(07), p. 2925, Jan 1997. [AAT 9637055]

A rubric was developed that would assess the process of creating a model, provide formative assessment information to students as models are created, and allow a variety of teachers to assess models objectively. Student improvement within a semester showed that formative feedback was being provided, and consistent scoring proved possible with a variety of teachers.

Assm, Rep (PS)

Keen, Carolyn Marie. (1996). *An investigation of the achievement of 4 x 4 block-scheduled advanced placement calculus AB students* (The College of William and Mary). DAI-A 57(12), p. 5000, Jun 1997. [AAT 9717679]

Students in schools where AP Calculus AB was taught in (n=252) one semester scored significantly lower on the AP exam than (n=355) students in schools where the course was taught in two semesters.

Calc, Ach (HS)

Kelleher, Heather Jane. (1996). *Making sense of number: A study of children's developing competence* (The University of British Columbia). DAI-A 58(06), p. 2120, Dec 1997. [AAT NN19597]

Cues and scaffolds were provided in interviews with (n=16) children to support their construction of meaning within their 'number construction zone' and towards the outer limits of their understanding. Results highlight specific conceptual, procedural, functional, and affective characteristics that most directly affected children's capacity to make sense of number situations.

NSns, Lrng (EC)

Kriek, Carel Gustav. (1996). *Mathematics curriculum development for the senior phase* (University of Pretoria). DAI-A 57(10), p. 4298, Apr 1997.

This study focuses on the development and presentation of a relevant and applicable curriculum for high schools in postapartheid South Africa.

Curr, Soc, Lrng (HS)

Kristjanson, Cheryl Roberta. (1996). *Voices from the other side of the room: A study on changing teaching strategies to include girls in math, science and technology* (The University of Manitoba). DAI-A 58(04), p. 1192, Oct 1997. [AAT NN16182]

Teachers in this project focused on adapting their teaching strategies and classroom environment in order to establish connections with their female students and between the subject and the student's real world. The results were an improvement in young women's enrollment, achievement, and attitudes toward mathematics, science, and technology.

Tchg, Gend (SE)

Lambert, Monica Ann. (1996). *Teaching students with learning disabilities to solve word-problems: A comparison of a cognitive strategy and a traditional textbook method* (Florida Atlantic University). DAI-A 57(07), p. 2966, Jan 1997. [AAT 9639550]

Study of learning disabled high school students (n=76) taught word problem solving using either traditional textbook instruction or a cognitive strategy method found no significant differences.

LD, PS (HS)

Lauten, Alice Darien. (1996). *Profiles of reform in the teaching of calculus: A study of the implementation of materials developed by the calculus consortium based at Harvard* (University of New Hampshire). DAI-A 57(08), p. 3419, Feb 1997. [AAT 9703361]

Six clustering scales (concepts, approach, teaching, assessment, technology, and access) were developed to analyze data from surveys of site liaisons and instructors at institutions implementing calculus reform. Eight types of interpretation and implementation of reform were identified. Faculty members were found to emphasize different aspects of reform depending on the context of their situations.

Calc, Curr, Teach, Assm, Tech (HS, PS)

Le, Xuan. (1997). *An investigation of learning approaches of nontraditional students in mathematics* (The University of Oklahoma). DAI-A 58(01), p. 114, Jul 1997. [AAT 9719649]

Nontraditional students (n=5) in college algebra were found to be serious learners who come into the course with high expectations. Those who have difficulties experience a mismatch between their expectations coming into the course and the new learning experience. They expected to be able to use the same study approaches they had in the past.

Lrnr, Styl, Alg (PS)

Lieberman, Joanne C. (1997). *Enabling professionalism in high school mathematics departments: The role of generative community* (Stanford University). DAI-A 58(02), p. 375, Aug 1997. [AAT 9723387]

Case studies of two high school mathematics departments found that the characteristics necessary for a department to be a professional community that enables the transition to student-centered practice include: (a) open department borders, (b) collective responsibility for the program, and (c) using guiding principles for practice and decisions.

Tchr, Tchg, TBlf (HS, T)

Lin, Pi-Jen. (1997). *Children's cognitive processes in solving two-step compare word problems* (University of Minnesota). DAI-A 58(03), p. 785, Sep 1997. [AAT 9724173]

Fourth graders (n=60) in Taiwan showed that the number of relational sentences with inconsistent structure increased the difficulty of two-step compare problems, and that problem structure was a major variable in deciding appropriate operations.

PS, Lang (EC)

Lobato, Joanne Elizabeth. (1996). *Transfer reconceived: How 'sameness' is produced in mathematical activity* (University of California, Berkeley). DAI-A 58(02), p. 406, Aug 1997. [AAT 9723086]

This analysis of students' understanding of the concept of slope revealed that transfer is not a decontextualized ability, independent of context. The findings also supported a breakdown of the classic distinction between surface and structure features in the traditional transfer paradigm.

Lrng, Alg (HS)

Manuse, Gary James. (1996). *The South Carolina Education Improvement Act: What effects has it had on a rural school district's high school mathematics curriculum?* (University of South Carolina). DAI-A 57(07), p. 2776, Jan 1997. [AAT 9637142]

Qualitative and quantitative data showed that the curriculum did change as a result of legislation. Instruction and student achievement gains were noted for the first five years, but not the last four years. Some intended aspects of reform, such as incorporation of higher order thinking skills, did not occur.

Curr, Ach, P/S (HS)

Martin, Tami Susan. (1997). *Calculus students' abilities to solve geometric related rate problems and their understanding of related geometric growth factors* (Boston University). DAI-A 58(02), p. 407, Aug 1997. [AAT 9723718]

Successful performance by first-year calculus students on geometric related rate problems included the following steps: implicitly differentiate, substitute and solve, and solve an auxiliary problem. Results suggested that understanding of related discrete changes may be connected to the ability to solve problems relating continuous changes.

Calc, Geom (HS, PS)

McCrone, Sharon Marie Soucy. (1997). *Student interactions and mathematics discourse: A study of the development of discussions in a fifth-grade classroom* (University of New Hampshire). DAI-A 58(04), p. 1227, Oct 1997. [AAT 9730833]

Classroom interactions were found to be regulated by the teacher, or the teacher with the students. Development of discourse was linked to the development of the student as learner and as a participant in the mathematics community, choice of mathematical tasks, students' social and mathematical roles, and classroom environment.

ClIn, Oral (MS)

McMann, Lawrence W. (1996). *The effects of using distance learning in a rural high school mathematics program* (Wayne State University). DAI-A 57(12), p. 5005, Jun 1997.

Technology, including satellite instruction, helped students increase application skills without losing ability to do routine computations. Implications are that "at-risk" students and lower achieving students could be helped by technology and satellite instruction that uses a nonconventional approach.

Comp, MMed (HS)

Meeks, Denise. (1997). *Mathematics anxiety and community college mathematics course completion* (Northern Arizona University). DAI-A 58(03), p. 711, Sep 1997. [AAT 9724921]

Results suggest that mathematics anxiety is negatively correlated with mathematics course grade (high anxiety decreases likelihood of high grade) and that age is positively correlated with mathematics course grade (likelihood of high grade increases with age).

Anx, Aff (PS)

Mesa, Vilma Maria. (1996). *The role of the graphing calculator in solving problems on functions* (University of Georgia). MAI 35(04), p. 937, Aug 1997. [AAT 1383728]

College students majoring in mathematics education were found to spend more time when the graphing calculator was available, and used it differently in each problem, with the type of problem being the greatest influence on how the graphing calculator was used.

GCal, PS (PS)

Meyer, Kimberly Anne. (1996). *Applied precalculus: An innovative approach to the learning and teaching of precalculus mathematics* (University of Illinois at Chicago). DAI-A 57(11), p. 4679, May 1997. [AAT 9713274]

This dissertation studied the implementation in a precalculus course of a model for the development of mathematical thinking involving the abstract-concrete cycle, the conceptual-procedural cycle, and the seminar-intense individual effort-collaborative work cycle. Results showed the experimental group outperformed counterparts.

Calc, Lrng (PS)

Miller, Margaret Rigby. (1996). *A comparison of the defining characteristics of college-level course work between and among English and mathematics faculty at a community college and a university* (Virginia Polytechnic Institute and State University). DAI-A 57(10), p. 4243, Apr 1997. [AAT 9710958]

The rationale behind this semi-structured interview study is equitable transfer of course credit. There were more similarities than differences in the comments among and between the groups. The analysis resulted in the identification of eight categories of characteristics defining college-level course work.

Plan, Curr (PS)

Miller, Nancy Peterson. (1997). *The relationships among beliefs, behavior and achievement of high school mathematics students* (The University of Chicago). DAI-A 58(01), p. 115, Jul 1997. [AAT 9720052]

Data from two questionnaires administered to high school algebra and geometry students showed various relationships between attribution of success and failure with use of resources, ability, effort, and achievement.

Blf, Ach, Alg, Geom, Gend (HS)

Molinsky, Michael Gordon. (1996). *Math outside the math department: Is it inevitable* (Idaho State University). DAI-A 57(07), p. 2926, Jan 1997. [AAT 9636938]

This study explored what mathematics topics taught by the mathematics department were being duplicated in courses taught in other academic departments, why these departments prefered to teach their own courses, and what could be done to reverse this trend.

Curr (PS)

Montis, Kristine Kowitz. (1997). *Kay: A case study of learning difficulties in mathematics and reading* (The University of Oklahoma). DAI-A 58(05), p. 1585, Nov 1997. [AAT 9733892]

Ten types of interventions were attempted with a 12-year-old student with learning difficulties, four of which had significant effect on school grades. Integral to success of these interventions was the clinical interview, which helped identify appropriate interventions. The study supports the desirability of using multiple approaches in a given situation.

LD, Lrng, Lang (MS)

Moody, Allen Bradley. (1996). *Discreteness of the van Hiele levels of student insight into geometry* (University of Arkansas). DAI-A 57(08), p. 3451, Feb 1997. [AAT 9700379]

A computer-administered software program, the Moody Test for van Hiele Geometry Levels, was constructed to investigate the discreteness of each student level, as defined by the van Hiele theory. The study concluded that the van Hiele levels do exhibit discrete intervals of student understanding of geometry. Approximately 82% of (n=76) females and 95% of (n=78) males were determined to fit the van Heile model.

Geom, Assm (HS)

Mustafa, Ahmad Moh'd. (1997). *An investigation of the understanding of the numerical experience associated with the global behavior of polynomial functions for students in graphing and non-graphing calculator college algebra courses* (University of New Orleans). DAI-A 58(05), p. 1629, Nov 1997. [AAT 9732828]

Students with graphing calculators had higher scores on a posttest and major differences with better reasoning about functional representations compared to students without graphing calculators.

GCal, Alg (PS)

Newman, Glenn Austin Robert. (1996). *The development of a study guide for adult students to learn statistics* (Columbia University Teachers College). DAI-A 57(07), p. 2926, Jan 1997. [AAT 9636007]

This research investigated the use of a study guide for statistics containing examples that adults might find in their everyday lives and employed other adult-specific strategies recommended by the literature. Over 75 percent of the (n=48) adult students found the study guide 'quite useful' in their study of statistics.

Stat, Matl (PS)

Nolan, E. Katherine. (1997). *Teachers' perceptions of the use of children's literature to create context for mathematics instruction* (The University of Alabama). DAI-A 58(06), p. 2080, Dec 1997. [AAT 9735734]

This qualitative study of three teachers and classrooms found four major themes common to the use of children's literature for mathematics instruction: interests, curriculum choices, teacher knowledge, and constraints. Appropriate choices of literature were found to depend on teachers' content knowledge in both mathematics and literature, and curricular choices were dependent on system curriculum and textbooks.

Lang, IC, Tknw, Curr (EC)

Ong, Wendy Sen. (1997). *The effects of multi-age classrooms on reading, mathematics, and writing achievement of third-grade students* (Arizona State University). DAI-A 58(03), p. 745, Sep 1997. [AAT 9725324]

Third-grade students in multi-age classes achieved significantly higher scores in reading, mathematics, and writing on a state-level standardized test than students in single-age classes. Multi-age classes are therefore a viable alternative to single-age classes, with no detrimental effects in the multi-age classes.

Ach, Grpg, Gend, Eth, Soc (EC)

Ou-Yang, Yin. (1997). *The development and validation of the instrument for evaluating Chinese educational software (IECES)* (The Ohio State University). DAI-A 58(02), p. 377, Aug 1997. [AAT 9721147]

Teachers (n=84) enrolled in an in-service teacher training program at The National Taipei Teachers College in Taiwan evaluated the technical quality and presentation, instructional quality, and pedagogical content of software using a new instrument labeled IECES. IECES was found to be appropriate, uni-dimensional, reliable, and easy to use.

Tech, Matl, CAI, Insv (EL, T)

Pagliaro, Claudia Maria. (1996). *Mathematics reform in the education of deaf and hard of hearing students* (Gallaudet University). DAI-A 57(08), p. 3457, Feb 1997. [AAT 9701032]

A moderate reflection of reform (in terms of curriculum, materials, administrative support, and professional development) was found in the mathematics education of deaf and hard of hearing students.

Curr, Lrnr (K-12)

Peach, Kent I. (1996). *The effects of socioeconomic status on student achievement: A longitudinal study* (University of Missouri - Columbia). DAI-A 58(01), p. 50, Jul 1997. [AAT 9720537]

A statistically significant difference was found between the mean Missouri Mastery and Achievement Test mathematics scores for two groups of second- through fifth graders, one group participating in free or reduced-fee lunch program and one not participating.

Soc, Ach (EL)

Perdue, Diana Sue. (1997). *A descriptive study of developmental mathematics students' beliefs and affects* (University of Virginia). DAI-A 58(06), p. 2122, Dec 1997. [AAT 9738779]

College students' (n=3) believe that classroom mathematics has no connection to the real world and they desire to know of applications. Students also expressed that instruction should actively involve them. Recommendations for teachers and researchers are given to address these issues.

Blf, Aff, Tchg, D/R (PS)

Peretz, Beny. (1997). *A comparative study of the effectiveness of Schoolwide Project schools and Chapter I Basic schools on the attendance and achievement of Chapter I and non-Chapter I students* (University of South Florida). DAI-A 58(03), p. 746, Sep 1997. [AAT 9724019]

Data in this causal-comparative study were collected on three dependent variables: (1) attendance rates, (2) student reading scores, and (3) student mathematics scores. Substantial increases in these three measures of students attending Schoolwide Project schools was expected. However, data indicated that Schoolwide Project schools (n=5) performed similarly to Chapter I Basic schools (n=6).

Curr, Ach (EL)

Perry, Rebecca Reed. (1997). *The role of teachers' professional communities in the implementation of California mathematics reform* (Stanford University). DAI-A 57(11), p. 4616, May 1997. [AAT 9714171]

Propositions regarding teachers' involvement in state-level policies and influences of school professional communities were examined. Conclusions indicate positive contributions of both strategies to teacher learning and implementations of 1992 Framework ideas.

Curr, Lrng (T)

Petry, Nell L. Greely. (1996). *Variables predictive of student success in Honors Pre-Algebra* (The University of Dayton). DAI-A 58(01), p. 115, Jul 1997. [AAT 9717873]

Results of data on (n=210) seventh graders indicated that teachers' responses on the Vandalia-Butler Advanced Mathematics Placement Teacher Checklist and students' responses on the 'willingness to engage in problem solving' section of the Indiana University Student Attitude toward Problem Solving Inventory were significantly related to student success.

Ach, Alg (MS)

Pryor, Othelia Washington. (1997). *The empirical study of the validity of the second grade primary mathematics performance assessment* (Michigan State University). DAI-A 58(05), p. 1673, Nov 1997. [AAT 9734175]

The Performance Assessment Validity Baseline Criteria was developed to examine the validity of the Second Grade Primary Mathematics Performance Assessment. Seven defined validity principles were investigated, yielding mixed results for the validity of the assessment. Factor analysis, t-tests, and correlation analysis as other means for examining the validity of the assessment did not allow for a robust interpretation.

Assm, Matl (EC)

Quinn, Mary Allison. (1996). *Measuring tutoring effectiveness by program delivery model: Small group tutoring compared to tutoring in labs in mathematics, physics, and accounting* (East Tennessee State University). DAI-A 57(07), p. 2840, Jan 1997. [AAT 9638792]

Findings of this study on the effects of tutoring showed that students who received tutoring in labs in mathematics had the highest semester grade point averages, and females earned higher course grades in mathematics, regardless of whether they were tutored or not.

Grpg, Gend (PS)

Remillard, Janine T. (1996). *Changing texts, teachers, and teaching: The role of curriculum materials in mathematics education reform* (Michigan State University). DAI-A 58(05), p. 1630, Nov 1997. [AAT 9734181]

The interactive relationship between a new mathematics textbook and (n=2) fourth-grade teachers' thinking about, and teaching of, mathematics was analyzed in order to develop a model of teachers' curriculum development activities.

Matl, Tchg, Curr, TBlf (EL, T)

Riehs, Robert Joseph. (1997). *The role of the mathematics coordinator in facilitating educational innovation* (University of Delaware). DAI-A 58(05), p. 1529, Nov 1997. [AAT 9733586]

Innovations reported by district-level mathematics coordinators (n=245) included reforms in mathematical content, instructional strategies, and the learning environment. Obstacles and strategies to overcome them are discussed, revealing some powerful options which have been used with success by those attempting to facilitate or support innovation in mathematics education.

Curr (Not given)

Riley, Angela H. J. (1997). *Student achievement and attitudes in mathematics: An evaluation of the twenty-first century mathematics center for urban high schools* (Temple University). DAI-A 58(06), p. 2122, Dec 1997. [AAT 9737988]

Students (n=78) who participated in the Twenty-first Century Mathematics Center for Urban Schools (The Center) were compared to students (n=78) who did not. A significant difference in mathematics achievement between the groups was detected. There was evidence of a positive effect on mathematics attitude for participation in the Center. The relationship that age, gender, grade, and race have on achievement and attitude was also explored.

Ach, Att, Gend, Ethn (HS)

Risku, Pekka. (1996). *A computer-based mathematics learning environment in engineering education* (jyvaskylan Yliopisto). DAI-C 58(03), p. 774, Fall 1997.

Students reacted positively, and performed as well as a control group, when taught mathematics using MathCAD engineering software.

Comp, Curr, Att (PS)

Robins, Rowland Robert. (1997). *Obligatory memory retrieval in mathematical problem-solving* (University of Houston). DAI-A 58(03), p. 741, Sep 1997. [AAT 9725695]

The Information Processing Theory of automaticity was examined in relation to solving simple linear equations and the mathematical ability level of the student (n=66). The results of this study did not demonstrate automaticity in solving linear equations. As automaticity was not demonstrated in this study, it follows that no significant relation between automaticity in solving linear equations and mathematical experience occurred either.

Lrng, PS (PS)

Rogers, Betty Martha. (1996). *A study of the pedagogy and curriculum of introductory mathematics courses at colleges and universities in Georgia* (University of Georgia). DAI-A 57(09), p. 3847, Mar 1997. [AAT 9705405]

Questionnaires sent to (n=60) mathematics department chairs of higher education institutions in Georgia found that computers and graphing calculators were not viewed as essential for introductory courses, although reform documents from professional mathematical societies were supported. No state-wide pattern of curriculur change and instructional reform was found.

Comp, GCal, Curr (PS)

Rogers, John Benjamin. (1996). *Single-response and multiple-choice response formats on a sixth-grade mathematics test: Evidence of construct validity* (The University of Connecticut). DAI-A 58(02), p. 432, Aug 1997. [AAT 9723485]

Sixth graders (n=1,680) were given two test forms consisting of 20 stem-equivalent items using either a single- or multiple-choice response format to measure computation, pattern recognition, problem solving, and geometry. Findings indicated that there were no differences between the correlations of the response formats and the three external measures of student achievement.

Assm (MS)

Rosen, Russell Scott. (1997). *Review as an extension of teaching: A conversational analysis* (Columbia University). DAI-A 58(04), p. 1193, Oct 1997. [AAT 9728302]

Ethnographic observations of two successive review sessions in math in a classroom of students who are deaf were conducted, and teacher-student dialogues were transcribed and analyzed. Findings suggest that reviews are prolonged discourses between teachers and students who undergo negotiations between questions and answers, and are an extension of teaching, helping to solidify student mastery of lesson materials.

Lrng, Tchg (Not given)

Rothschild, Karen J. (1997). *Dancing at two weddings: A case study of mathematics reform* (University of Pennsylvania). DAI-A 58(03), p. 786, Sep 1997. [AAT 9727288]

An analytical framework for understanding classroom mathematical activity as well as a description and analysis of one model of NCTM-prescribed reform in practice in a seventh-grade mathematics course are provided. Implications for students and teachers are discussed.

Curr, Phil, Tchg, Lrng (MS)

Rowland, Timothy. (1995). *Vagueness in mathematics talk* (Open University). DAI-C 58(01), p. 7, Spr 1997.

This research considers the practical purposes which speakers achieve by means of vague utterances in context. The claim is that vagueness can be viewed and presented, not as a disabling feature of language, but as a subtle and versatile device which speakers can and do deploy to make mathematical assertions with as much precision, accuracy or as much confidence as they judge is warranted by both the content and the circumstances of their utterances.

Oral, CIln (MS)

Royer, Lynn Best. (1996). *Implementing resources for reform: One teacher's experience with a standards-based mathematics curriculum* (Western Michigan University). MAI 35(02), p. 391, Apr 1997. [AAT 1382381]

This study attempted to uncover what motivated one teacher to persist in learning new ways to teach mathematics. Findings indicate that this teachers' efforts to implement a reform mathematics curriculum faced many impediments.

Curr, TBlf, Tchg (T)

Ruiz Higueras, Luisa. (1994). *Secondary school pupils' conceptions about the notion of function: An epistemological and didactic analysis* (Universidad De Granada). DAI-C 58(03), p. 768, Fall 1997.

This study provides elements for analyzing the teaching of the notion of function as well as for evaluating the pupils' conceptions. The research has led, on the one hand, to detecting several inconsistencies in the pupils' knowledge, and on the other hand, the determination both of didactic obstacles, due to the way the education system functions, and obstacles at the level of the pupils' knowledge.

Alg, Mscn (SE)

Ryan, Walter Francis. (1996). *The distance education delivery of senior high advanced mathematics courses in the province of Newfoundland and Labrador: A study of the academic success and academic progress of the participating students* (Ohio University). DAI-A 57(07), p. 2841, Jan 1997. [AAT 9369709]

No difference in achievement levels were found for senior high school students involved in a distance-learning advanced mathematics course versus a traditional course. Constraints to effective interactions in distance education were the different mode of communication, limited access by students to the instructor and lack of visual link between students and instructor.

MMed, CIln, Lrng (HS)

Saeed, Radman Mohamed. (1996). *An exploratory study of college students' understanding of mathematical proof and the relationship of this understanding to their attitude toward mathematics* (Ohio University). DAI-A 57(10), p. 4300, Apr 1997. [AAT 9707707]

This study investigated (n=101) college students' understanding of some selected aspects of mathematical proof. Results include the finding that many students did not distinguish between an explanation and a formal mathematical proof and also did not see any need to prove a mathematical statement they intuitively considered to be obvious.

Prf, Att (PS)

Sallee, Adeana Blakley. (1996). *Children's construction of knowledge about fractions through writing* (Oklahoma State University). DAI-A 58(01), p. 115, Jul 1997. [AAT 9717972]

An investigation of (n=22) fourth graders found that the majority of students were able to construct their knowledge of fractions through the use of writing. Most of the students felt that documenting written information in a variety of ways was beneficial for learning.

Writ, Frac (EC)

Salmon, Susan J. (1997). *Alternative math assessment: Teachers making sense of assessment in their classrooms* (State University of New York at Buffalo). DAI-A 58(01), p. 115, Jul 1997. [AAT 9719172]

Teachers (n=10) in Western New York school districts designed and used performance based assessments in their classrooms, based on the curriculum provided by the state. The assessment instruments reflect that teachers have linked their instruction and assessment to try and help students gain knowledge over the course of instruction. Conclusions provide support for the current reform taking place in the mathematics community.

Assm, Curr (EL, T)

Sanchez, Raul A. (1996). *Teachers' and students' mathematical thinking in a calculus classroom: The concept of limit* (The Florida State University). DAI-A 57(07), p. 2927, Jan 1997. [AAT 9700247]

The purpose of this study was to investigate one teacher's thought processes when teaching the concept of limit as it occurs in a classroom setting during the instruction in an introductory calculus course, and selected students' cognition and understanding of the concept of limit in this context.

Calc, PS (PS, T)

Saunders, Beverly Ann. (1996). *The absence of black students in advanced mathematics classes: Racial relationship factors* (Walden University). DAI-A 58(03), p. 787, Sep 1997. [AAT 9726366]

The study investigated the factors that contributed to the success of Black students who persisted in advanced mathematics classes, versus the factors that contributed to the lack of success of Black students who did not persist in advanced mathematics classes despite their above average achievement test scores.

Ethn, Eqty, Ach (MS)

Schneider, Alfred Franz. (1997). *The influence of affect on participation in problem-solving activities* (University of Georgia). DAI-A 58(06), p. 2123, Dec 1997. [AAT 9735563]

A variety of patterns were found relating to the emotional arousal experienced by students causing them to ignore or abandon difficult problems. The teacher became the primary intervention agent between students and problem solving activities by responding in certain ways to the students' emotional status. Appropriate intervention strategies are identified and suggested.

Aff, PS, Tchg (HS)

Selitto, George Louis. (1997). *An identification of problematic algebraic concepts and the understanding possessed by students in elementary algebra* (Columbia University). DAI-A 58(02), p. 407, Aug 1997. [AAT 9723850]

General concepts that are particularly problematic for students include operating with variables to simplify expressions, cancellation, solving equations, and function. Regardless of achievement level, New York City students (n=40) have misconceptions in areas of the abstract notation of "variable" and its uses. Students with lower achievement hold more misconceptions described in the study.

Alg, Mscn (SE)

Sherin, Miriam Gamoran. (1996). *The nature and dynamics of teachers' content knowledge* (University of California, Berkeley). DAI-A 57(09), p. 3863, Mar 1997. [AAT 9703279]

This dissertation investigated the role of content knowledge in teaching under conditions in which teachers' abilities are taxed in two ways: the teachers use a novel curriculum, and the subject matter is complex.

TKnw, Curr (T)

Shew, Julia Allison. (1996). *Students' beliefs about mathematics and the way it should be learned: A story of struggle and change* (The University of Wisconsin - Madison). DAI-A 57(12), p. 5091, Jun 1997. [AAT 9708285]

This study identified common themes, patterns, characteristics, and unique differences among selected fifth-grade students related to their beliefs about mathematics as a discipline, how mathematics is learned, how to determine when or if they understand a mathematical concept, and the student's and the teacher's role in the mathematics class.

Blf, Lrng (MS)

Siadat, Mohammad Vali. (1997). *Building study and work skills in a college mathematics classroom* (University of Illinois at Chicago). DAI-A 58(04), p. 1227, Oct 1997.

Community college mathematics classes were used to enhance students' work and study habits and improve their concentration skills. On top of good results in mathematics, students' reading comprehension scores greatly improved, showing that mathematics can be a universal educational tool.

Phil, Lrng (PS)

Slaughter, Renate Elisabeth Krippels. (1996). *A comparison of four error correction procedures used in peer tutoring of multiplication facts* (Northern Illinois University). DAI-A 57(09), p. 3820, Mar 1997. [AAT 9703760]

Statistically significant differences were found among treatment conditions for probes, posttests, and length of tutoring sessions. Third grade student performance improved under all conditions, but correct responses on probes and posttests were consistently highest under the multiple immediate practice with two delayed practice trials error correction procedure.

M/D, Grpg (EC)

Slovin, Hannah. (1996). *A qualitative study of elementary mathematics teaching practice relative to the National Council of Teachers of Mathematics 'Professional Standards for Teaching Mathematics'* (University of Hawaii). DAI-A 57(11), p. 4654, May 1997. [AAT 9713981]

A case study of a sixth-grade teacher indicated that four factors included in the NCTM Standards (task selection and formulation, classroom discourse, classroom environment, and analysis of teaching and learning) do highlight key aspects of teaching and learning mathematics. Several recurring tensions remain: what constitutes valid and worthwhile mathematical knowledge, decisions associated with planning, and the social contract in the classroom.

Tchg, Curr (EL, T)

Smid, Harm Jan. (1997). *Een onbekookte nieuwigheid? Invoering, omvang, inhoud en betekenis van het wiskundeonderwijs op de franse en latijnse scholen 1815-1863 [Title in English: An ill-considered novelty? Introduction, extent, content and significance of mathematics education on French and Latin schools, 1815-1863]* (Technische Universiteit Te Delft). DAI-C 58(03), p. 765, Fall 1997.

Detailed descriptions of the teaching of mathematics in the French and Latin schools before 1863 are used to argue that, long before the start of HBS, mathematics education in secondary schools in The Netherlands had become a matter of importance. Creation of the HBS, a Dutch version of the German Realschule, was an important step forward but not as big as usually is supposed.

Curr (SE)

Smith, Janna Kay Homann. (1996). *The impact of children's literature on student mathematics attitudes* (Saint Louis University). DAI-A 57(07), p. 2928, Jan 1997. [AAT 9638897]

Study of fourth graders' attitudes toward mathematics in classrooms integrating children's literature found positive changes in student attitudes toward mathematics resulting primarily from the use of children's literature in a majority of the fourth grade mathematics experience. Storybooks were found to be helpful in their problem solving efforts.

IC, Att (EC)

Smith, Kristi Lyn Fleming. (1997). *Types of mathematics assessments being administered in kindergarten through fifth grade classrooms in the state of Georgia* (Kansas State University). DAI-A 58(06), p. 2123, Dec 1997. [AAT 9736740]

Types of assessment practices being used by teachers were examined and found to be somewhat in harmony with NCTM standards. However, tests administered by the Georgia Department of Education did not involve extensive use of multiple modes of assessment.

Assm, Curr, Tchg (EL, T)

Snook, Kathleen Gerard. (1997). *An investigation of first-year calculus students' understanding of the derivative* (Boston University). DAI-A 58(02), p. 407, Aug 1997. [AAT 9722765]

The levels of understanding determined by students' written performances on a Derivative Test were comparable to the levels of understanding determined by their verbal performances in interviews within some, but not all, problem categories. Relationships depended upon the type and presentation of problems.

Lrng, Calc, Assm (PS)

Sottile, Frank Joseph. (1997). *Teachers' perceptions of implementing the assessment standards for school mathematics in the classroom: A qualitative study of implementing authentic assessment in the teaching and learning of mathematics* (Temple University). DAI-A 58(03), p. 788, Sep 1997. [AAT 9724282]

By teacher interviews (n=23), assessment methods were examined as a factor in the concern about educational crises in the U.S. The focus was how to accurately assess the educational achievements of students. Issues addressing reform are discussed.

Assm, Curr, TBlf (HS, T)

Spence, Mary Stener. (1997). *Psychologizing algebra: Case studies of knowing in the moment* (The University of Wisconsin - Madison). DAI-A 57(12), p. 5091, Jun 1997. [AAT 9711008]

An in-depth case study of two teachers' knowledge and classroom practices as they attempted to reconstruct their teaching in the presence of Mathematics in Context materials, shows the influence of reform material and of the researcher on change in teaching practice. The finding that text and materials alone are not enough to bring about reform is supported.

Curr, Matl, Tknw, Tchg (SE, T)

Stengel, Margaret D. (1996). *Principal/teacher collaborative action research: The study of gender equity issues in three elementary mathematics classrooms* (University of Pennsylvania). DAI-A 57(07), p. 2791, Jan 1997. [AAT 9639693]

This collaborative action research study investigated three elementary mathematics teachers' awareness of pedagogical practices that impeded or advanced gender equity within their classrooms. The author found that the number and quality of teachers' interactions may be influenced more by explicit pedagogical considerations than by gender factors.

Gend, Eqty, Rsch, Tchg (EL, T)

Steward, Cynthia S. (1997). *Factors influencing enrollment in mathematics courses by college freshmen* (Texas A&M University - Commerce). DAI-A 58(03), p. 788, Sep 1997. [AAT 9724627]

Responses of students on the Critical Incident Technique show that teacher personality and traits was the single most specific influential element on enrollment in mathematics classes. High school course selection was also important. A register of potential approaches in the development of mathematics programs is given.

Blf, Tchr (PS)

Stimpson, Virginia C. (1996). *Quandaries teachers experience as they work to align their practice with the N.C.T.M. 'Standards'* (University of Washington). DAI-A 57(12), p. 5091, Jun 1997. [AAT 9716929]

Observations of and interviews with two middle school mathematics teachers found that teachers' concerns about time constraints and epistemological responsibilities in the face of their students' seemingly errant explorations, seem to be the biggest reason there is little significant change in practice.

Tchg, TBlf (MS, T)

Stump, Sheryl Lynne. (1996). *Secondary mathematics teachers' knowledge of the concept of slope* (Illinois State University). DAI-A 58(02), p. 408, Aug 1997. [AAT 9721399]

Exploration of the concept of slope of (n=18) preservice and (n=21) inservice secondary mathematics teachers found that their understandings were dominated by geometric representations and that inservice teachers gave more responses, made more references to specific courses, and had greater understanding of the trigonometric representation of slope.

Alg, TKnw, Geom (SE, T, TE)

Swail, Watson Scott. (1996). *The development of a conceptual framework to increase student retention in science, engineering, and mathematics programs at minority institutions of higher education* (the george washington university). DAI-A 57(09), p. 3849, Mar 1997. [AAT 9703727]

Objectives of this research were to identify causal factors regarding minority-student attrition, identify successful retention practices and programs, and develop a retention framework for administrators and practitioners to utilize during the planning and implementation stages of program development.

Ethn, Curr (PS)

Tay, May Ping. (1996). *How children's agency and means-ends beliefs predict their control beliefs, task engagement, and achievement in math* (The Florida State University). DAI-B 57(08), p. 5368, Feb 1997. [AAT 9700196]

The present study investigated how (n=291) fifth graders' agency beliefs and means-ends beliefs for ability, effort, powerful others, and luck at the start of the academic year: (1) predicted mid-year task engagement; (2) related to their concurrent control beliefs; and (3) predicted their end-of-year achievement, after controlling for prior achievement.

Blf, Ach (EL)

Treaster, Sharon Jeennine. (1996). *A study of the relationship between enrollment size and math achievement in Kansas school districts* (Kansas State University). DAI-A 57(11), p. 4620, May 1997. [AAT 9714467]

The primary purpose of this study was to determine if there was a relationship between school enrollment size and mathematical achievement of students in grades 4, 7, and 10. There seemed to be little reason to believe that school enrollment size was closely related to mathematics achievement.

Soc, Ach (K-12)

Tsai, Wen-Huan. (1996). *Linkage between formal knowledge and informal knowledge: Teaching arithmetic based on children's cultural activities* (University of Minnesota). DAI-A 57(08), p. 3435, Feb 1997. [AAT 9702823]

Results of this study suggested that (n=625) second-grade children taught arithmetic based on the Cultural Conceptual Learning Teaching Model performed higher on the School Achievement Tests than control group children.

Soc, Arth, Knw (EC)

Tusgate, Yawarat. (1996). *Mathematical concepts and practice: A comparative analysis of grade one Thai mathematics curriculum documents with the NCTM curriculum standards of the United States* (Washington Sate University). DAI-A 57(11), p. 4679, May 1997. [AAT 9711539]

A comparative study focuses on (a) content analysis searches for similar and different expectations of curriculum standards, (b) pedagogical analysis is based on how mathematics should be taught. It was found that Thai mathematics curriculum documents for Grade One do not reflect the NCTM curriculum standards.

CC, Curr (EC)

Uen, Wuu-Nan. (1997). *A descriptive study on mathematical teaching styles of junior high mathematics teachers in Taiwan* (The University of Wisconsin - Madison). DAI-A 58(06), p. 2123, Dec 1997. [AAT 9726178]

Teaching and learning styles were studied, especially in relation to each other, using two variables of learning style theory: brain dominance and perceptual modality. Significant associations and differences are discussed.

Tchg, Lrng, Styl (MS, T)

Van Dyke, Derek Richard. (1996). *Calculators in the mathematics classroom: A study of technology and affect* (pacific lutheran university). MAI 35(01), p. 40, Feb 1997. [AAT 1381000]

This study analyzed the effect of technology on the formation of emotions, attitudes, and beliefs of (n=213) seventh graders. Students observed failed to demonstrate competency in basic skills and found little enjoyment in mathematics. The author draws implications for increased use of calculators in mathematics.

Calc, Aff, Blf (MS)

Van Etten, Karl. (1997). *The comparative undergraduate performance and persistence of students who do not enroll in developmental classes at Colorado state system community colleges* (University of Northern Colorado). DAI-A 58(04), p. 1187, Oct 1997. [AAT 9729081]

The academic performance of students who took developmental classes (n=91) was compared with that of students who did not (n=91) to find effects on the students' subsequent undergraduate academic performance. Findings indicate that developmental classes in the basic skills do help students overcome lack of preparedness for college-level work.

D/R, Ach (PS)

Vavra, Anthony Joseph. (1996). *A comparison of the performance of developmental students with regular students in a college-level mathematics course* (West Virginia University). DAI-A 57(07), p. 2843, Jan 1997. [AAT 9639454]

No significant differences were found in the performance of students identified by test scores as requiring a developmental algebra course as compared to students in the same course who were not required to take the course.

Alg, D/R, Assm (PS)

Vincent, James Lyle. (1996). *The effects of behavioral momentum on task initiation, math performance, and problematic behaviors of residential youth* (The University of Nebraska - Lincoln). DAI-A 57(07), p. 2862, Jan 1997. [AAT 9637082]

The current study evaluated the effects of behavioral momentum on task initiation, math performance and problematic behaviors of (n=4) residential youth ages 13 to 14. While some subjects clearly benefited from the momentum training, one subject found the addition of praise to the high-probability sequence punishing.

Soc, Aff (SE)

Walder, Robert Howard. (1996). *Common core computational skills used by manufacturing technicians in West Central Ohio* (the ohio state unviersity). DAI-A 57(07), p. 2914, Jan 1997. [AAT 9639370]

The 'common core' entry-level mathematical related knowledge, skills, and abilities needed by manufacturing technicians in west central Ohio were found to be: interpreting drawing specifications, applying drawing specifications, and reading drawings with rectangular coordinates.

Soc, Arth (PS)

Wang, Hwa-Pey. (1997). *The effects of a computer-based self-instruction training program (CBST) on the mathematics performance of children with learning disabilities* (The Johns Hopkins University). DAI-A 58(04), p. 1248, Oct 1997. [AAT 9730805]

Students (n=6) were taught to use four general-to-specific self-instructional steps that were built into a computer program to solve missing-addend problems. Following training sessions, students demonstrated competence to solve problems at a high level of accuracy, both on computer-based and on paper-and-pencil tasks.

LD, CAI, Arth (EL)

Ward, Robin Anne. (1997). *An investigation of scaling issues and graphing calculator-associated misconceptions among high school students* (University of Virginia). DAI-A 58(06), p. 2124, Dec 1997. [AAT 9738782]

Students (n=18) were observed to see how they interpreted and selected scales of graphs when using a graphing calculator. Strategies used to obtain appropriate viewing windows and misconceptions about the calculators are identified.

GCal, Mscn (HS)

Ware, Melva Lawson. (1996). *Academic performance and factors affecting college success as perceived by African-American undergraduates with majors in four areas: The sciences, engineering, mathematics, and technology* (saint louis university). DAI-A 58(01), p. 107, Jul 1997. [AAT 9718160]

This study examined perceived factors associated with college success by black students enrolled in science, engineering, mathematics, and technology undergraduate programs. The study compared perceptions of higher and lower achieving students across institutional enrollment types with regard to institutional features and personal behaviors associated with college persistence and achievement.

Ethn, Soc (PS)

Washington-Harvey, Carmela M. (1997). *A study of African-American students' attitudes, perceptions, and academic performance in college level mathematics courses* (The Claremont Graduate University). DAI-A 58(05), p. 1618, Nov 1997. [AAT 9730925]

Perceptions of African-American students (n=18) and factors that contribute to their experiences in classes were addressed. The findings revealed gender differences in learning preference, study orientation, faculty/student interaction, attitudes toward mathematics, and academic performance in mathematics.

Ethn, Gend, Styl, Att (PS)

Webb, Evelyn E. J. (1996). *The Meyers-Briggs type indicator and retention of students at the Mississippi school for mathematics and science* (The University of Southern Mississippi). DAI-A 57(07), p. 2958, Jan 1997. [AAT 9638556]

Administration of the Myers-Briggs Type indicator to (n=42) high school juniors and seniors found students' psychological types did not significantly influence their persistance to graduation. No significant relationships were found between race and persistance nor gender and persistance.

Styl, Ethn, Gend (HS)

Weiner, Robin K. (1997). *The efficacy of conjoint behavioral consultation with a combined homework model to increase math homework completion and accuracy in junior high students* (The University of Utah). DAI-A 58(04), p. 1201, Oct 1997. [AAT 9729401]

Conjoint behavioral consultation (CBC) was used as an intervention strategy for at-risk students (n=6). During treatment, completion of homework rates improved for some students and accuracy rates increased but not substantially. At follow-up, some students maintained or improved gains made during treatment.

Soc (MS)

Whalen, John William. (1997). *The influence of semantic number representations on arithmetic fact retrieval* (The Johns Hopkins University). DAI-B 58(01), p. 443, Jul 1997. [AAT 9719048]

Two theoretical positions were tested to explore how arithmetic facts are stored and retrieved in memory. Performance of a brain-damaged patient was found to be incompatible with a phonological storage hypothesis. However, Semantic Network Retrieval Theory is supported.

Lrng, Arth (Not given)

Whitus, Ernest Ferrell. (1996). *The predictive effects of the mathematics portion of the Texas Assessment of Academic Skills test (TAAS) and other variables on the mathematics portion of the Texas Academic Skills Program* (Texas A&M University - Commerce). DAI-A 58(03), p. 713, Sep 1997. [AAT 9724631]

Subjects (n=962) of this study were enrolled in community colleges as first-time, full-time students. Academic achievement was employed as the criterion variable for the three hypotheses of this study as measured by student performance on the mathematics portion of the TASP.

Ach, Assm, Ethn, Soc, Gend (PS)

Wilder, Margaret Ramsey. (1994). *The effects of a simulation test model of the General Education Development (GED) program as compared to the effects of a drill and practice, both computer-based and workbook-based on GED. Mathematics scores, retention, and time* (Grambling State University). DAI-A 57(07), p. 2808, Jan 1997. [AAT 9639896]

This study examined the effects of a computer-based instructional (CBI) simulation-test (simulation) treatment to a CBI drill and practice (drill) treatment. The traditional drill and practice (workbook) served as a baseline for this study.

The findings support the use of computer-based instruction in adult education classes.
Curr, Comp (PS)

Wilhite, Paula Ann Goodman. (1996). *Effect of high school calculus background on the variation in academic achievement among students in undergraduate calculus* (Texas A&M University - Commerce). DAI-A 58(03), p. 788, Sep 1997. [AAT 9724632]

An investigation of (n=404) students' college calculus achievement found that the variables ACT mathematics scores, high school rank, age, and high school mathematics grade-point-average produced a statistically significant predictive model for academic achievement in college calculus.
Calc, Ach (PS)

Wilkins, Jesse Leroy Muller. (1997). *Modeling correlates of problem-solving skills: Effects of opportunity-to-learn on the attainment of higher-order thinking skills in mathematics* (University of Illinois at Urbana - Champaign). DAI-A 58(06), p. 2124, Dec 1997. [AAT 9737288]

Five measures of classroom experiences associated with the development of students' (n=1327) higher-order thinking skills (HOTS) were investigated in terms of their validity as indicators of classroom opportunity-to-learn (OTL) and found to be useful. Classroom OTL was found to have a direct additive relationship with average student proficiency of HOTS.
Curr, PS (HS)

Wilson, Vicki A. (1996). *Factors related to anxiety in statistics* (The Unviersity of Southern Mississippi). DAI-A 57(10), p. 4253, Apr 1997. [AAT 9708978]

Study of (n=178) business and education students in graduate statistics courses found that mathematics preparation, perception of mathematics ability, proficiency in calculator use, and gender were statistically significant predictors of statistics anxiety.
Anx, Stat (PS)

Wiltshire, Michael A. (1997). *Integrating mathematics and science for below average ninth grade students* (Columbia University Teachers College). DAI-A 58(05), p. 1572, Nov 1997. [AAT 9734098]

An integrated mathematics and science course was developed and its effect on students' (n=94) performance was investigated. Significant results suggest that the most effective approach to teaching mathematics and science for below average students maybe an integrated curriculum and an "experimental methodology."
IC, Curr, PS (HS)

Wolf, Neli Sorina. (1996). *Learning to teach mathematics for understanding: A case of a student teacher in a professional development school* (Michigan State University). DAI-A 57(09), p. 3898, Mar 1997. [AAT 9706577]

This study examined what and how a prospective elementary teacher learned about teaching mathematics for understanding during student teaching in a professional development school. The study has implications for the kind of student teaching that teachers and teacher educators need to construct for novices.
Tchg, Prsv (EL, TE)

Wu, Chi-Ming. (1997). *An analysis of the on-time graduation rate in the two-year program at National Taipei Institute of Technology in Taiwan* (Florida International University). DAI-A 58(04), p. 1227, Oct 1997. [AAT 9730202]

The results of two-year junior college students' (n=521) performance in calculus and on-time graduation were analyzed and correlated. It is suggested that two-year junior college curriculum standards in Taiwan be reformed to emphasize basic rudimentary courses.
Curr, Calc, Ach (PS)

Wyllie, Richard J. (1996). *The effects of implementing a supplemental research-based instructional unit on students' cognitive-related obstacles associated with linear equation solving in algebra* (Northern Illinois University). DAI-A 57(12), p. 5092, Jun 1997. [AAT 9716568]

A treatment group (n=53) was taught a unit of instruction beginning with a cognitive structure facilitator based on the advance organizer. Results failed to show that the instructional unit had an effect on the cognitive obstacles formed by students. However, the treatment group results did indicate an improvement in the application of unitizing.

Alg, Tchg, Lrng (HS)

Yang, Der-Ching. (1995). *Number sense performance and strategies possessed by sixth- and eighth-grade students in Taiwan. Performance data on the number sense ability* (University of Missouri - Columbia). DAI-A 57(09), p. 3865, Mar 1997. [AAT 9705388]

A number sense test, mental computation test, and written computation test given to (n=115) sixth-grade and (n=119) eighth-grade Taiwanese students found that students who could correctly carry out exact computations by paper-and-pencil were not necessarily successful in applying these skills in non-computational situations.

NSns, Arth (MS)

Zolkower, Betina A. (1997). *Math fictions: Elementary mathematics education and the modern pedagogical paradigm* (City University of New York). DAI-A 58(01), p. 116, Jul 1997. [AAT 9720161]

A reformulation of the old-time problem of widespread failure in elementary mathematics and what may be done about it was proposed. Elements of the critical sociology of education, didactic contract theory, didactical transposition, child-centeredness, progressivism, and constructivism are discussed and critiqued.

Phil, Lrng (EL)

Dissertations and Theses by Institution

Canada

Simon Fraser University
Nguyen; Hammill

University of Alberta
Barnes

University of British Columbia
Kelleher; Ma; Nicol

University of Calgary
Maeers

University of Manitoba
Kristjanson

University of Regina
Kang

University of Toronto
Tiessen; McCaul; Nocente

Finland

jyvaskylan Yliopisto
Risku

Netherlands

Technische Universiteit Te Delft
Smid

New Zealand

University of Auckland
Irwin

South Africa

University of Pretoria
Kriek

Spain

Universidad De Granada
Contreras; Estepa; Ruiz

Universidad De Murcia
Gonzalez-Herrerd

Universitat Autonoma De Barcelona
Bosch

Universitat De Barcelona
Barbera

Sweden

Goteborgs Universitet
Ekeblad

Lunds Universitet
Engstrom

Stockholms University
Chen

United Kingdom

Open University
Atkinson; Bills; Jennings; Rowland

United States

American University
Hare

Arizona State University
Ong

Auburn University
Bass

Ball State University
Gardner

Baylor University
Price-Baugh

Boston College
Armstrong; Jones

Boston University
Century; Martin; Snook; Sokolowski

Central Michigan University
Baez

City University of New York
Zolkower

Claremont Graduate University
Washington-Harvey; Watson

College of William And Mary
Keen

Columbia University
Buerger; Delo; Golinskaia; Rosen; Selitto

Columbia University Teachers College
Alon; Feliciano; Ferraro; Ito; Mistretta; Newman; O'Brien; Peskoff; Rivera; Smith; Uy; Wiltshire

Cornell University
Howard

Duquesne University
Gregory

East Tennessee State University
Quinn

East Texas State University
Ferguson; Hughes; Landers; Piearcy; Russell

Florida Atlantic University
Husni; Lambert

Florida International University
Wu

Florida State University
Ashley; Hall; Hardy; Sanchez; Search; Tay

Gallaudet University
Pagliaro

George Mason University
Cooper

George Washington University
Radwan; Swail

Georgia Southern University
Futch

Georgia State University
Garrison

Grambling State University
Burton; Fagbeyiro; Johnson; Penny; Pruett; Simeon; Wilder

Harvard University
Adair; Fulmer; Graham; Mayer; Stroup

Howard University
Jeffers

Idaho State University
Darrow; Molinsky

Ilinois State University
Stump; Markward

Indiana State University
Ford; Martin

Indiana University
Benbow; Bonn; Croft; Wiest

Iowa State University
Forbes; Gettys; Jong; Kim

Johns Hopkins University
Rhee; Wang; Whalen

Kansas State University
Henderson; Smith; Treaster

Kent State University
Barb; Clark

Lehigh University
Grigoruk

Louisiana State University and Agricultural and Mechanical College
Eilers

Marquette University
Rupnow

Michigan State University
Jakwerth; Pryor; Remillard; Theule-Lubienski; Wolf

Montana State University
Helfgott; Oursland

Morgan State University
Batoff

New Mexico State University
Woods

New York University
Berry

North Carolina State University
Bragg; Coulombe; Haynie; Hollar; Lawrence; Sakshaug

Northern Arizona University
Meeks; Nichols

Northern Illinois University
Covalt; Harris; Klanderman; Slaughter; Wyllie

Nova Southeastern University
Shaw

Ohio State University
Doenges; Fitzsimmons; Good; Ou-Yang; Watson; Walder

Ohio University
Al-Natour; Almeqdadi; Jones; Ryan; Saeed; Yousef

Oklahoma State University
Cox; Sallee

Oregon State University
Hale; Utter; Wohlhuter

Pacific Lutheran University
Van

Purdue University
Gregg; Kao; Petty

Rutgers University - New Brunswick
Debellis; Hammett; Passantino; Ramus

Saint Louis University
Smith; Ware

Seton Hall University
Chinni; Burke; McGeehan

Southern Illinois University at Carbondale
Conway; Pineda

Southern Illinois University at Edwardsville
Lockart

St. John's University (New York)
Verna

Stanford University
Bushey; Cossey; Krohn; Lieberman; Perry

State University of New York at Albany
Lowinger; Gau; Pulver; Salmon

Temple University
French; Jackson; Riley; Sottile; Wilburne

Texas A&M University
Ache

Texas A&M University - Commerce
Grant; Smith; Steward; Whitus; Wilhite

Texas A&M University - Kingsville
Camacho

Texas Southern University
Washington

Texas Tech University
Lin

Texas Woman's University
Smith

United States International University
Rader

University of Akron
Klein

University of Alabama
Boggs; Earhart; Harris; Nolan

University of Alabama at Birmingham
White

University of Arizona
Miller; Uecker

University of Arkansas
Moody

University of California, Berkeley
Chiu; Lobato; Sherin

University of California, Los Angeles
Cohen; Kennedy; Stone; Wellman; Wilkins

University of California, Riverside
Moore

University of California, Santa Barbara
Collins

University of California, Santa Cruz
St

University of Chicago
Borman; Heine; Miller

University of Cincinnati
Curtis; Horton; Taddese

University of Colorado at Boulder
Flory; Kiplinger

University of Connecticut
Arthurs; Bosse; Rogers

University of Dayton
Petry

University of Delaware
Alexander; Elliott; Hillman; Riehs; Wismer

University of Florida
Cyrus

University of Georgia
Brown; Choi; Hooper; Howell; Mesa; Messer; Moody; Myers; Rogers; Schneider; Whitmire

University of Hartford
Joannon-Bellows

University of Hawaii
Slovin

University of Houston
Cunningham; Loiacano; Robins

University of Illinois at Chicago
Lai; Meyer; Siadat

University of Illinois at Urbana - Champaign
Altman; Alidou; Caldwell; Chirwa; Wilkins

University of Iowa
Hensey; Payne; Stephen; Tsai

University of Kansas
Pickreign; Roberts

University of La Verne
Tierney

University of Lowell
Spadano

University of Maryland - College Park
Abbey; Case; Dance; Lollis; Sullivan; White

University of Maryland Baltimore County
Tissot

University of Massachusetts
Gutbezahl; Henriques

University of Miami
Giovinazzo

University of Michigan
Lloyd

University of Minnesota
Chang; Katzman; Kinney; Lin; Tsai

University of Mississippi
Cibic

University of Missouri - Columbia
Balli; Bissey; Keif; Peach; Yang

University of Missouri - Kansas City
Austin; Benson; Ramey; Rodgers

University of Montana
Gilmore; Keck

University of Nebraska - Lincoln
Pourboghrat; Robison; Vincent

University of New Hampshire
Lauten; McCrone

University of New Mexico
Hyer; Jacobi

University of New Orleans
Cook-Bax; Daniel; Goldsby; Heath; Mustafa

University of North Carolina at Greensboro
Carnell

University of North Texas
Hunt; Jones; Karr

University of Northern Colorado
Isom; Mingus; Van

University of Oklahoma
Le; Montis

University of Oklahoma
Curda; Curda

University of Pennsylvania
Rothschild; Stengel

University of Pittsburgh
Magone

University of Rhode Island
Hayden

University of Rochester
Armstrong

University of South Alabama
Ellingwood

University of South Carolina
Kinard; Manuse; Snead

University of South Florida
Peretz; Smith

University of Southern California
Belongia

University of Southern Mississippi
Bullock; Johnson; Rushing; Webb; Wilson

University of Tennessee
Bailey; Brown; Winstead

University of Texas at Austin
Beauford; Hanna; Leake; Ruddock

University of Toledo
Chen, Culbertson

University of Utah
McCormick; Weiner

University of Virginia
Ensign; Perdue; Ward

University of Washington
Chappell; Stimpson; Yates

University of Wisconsin - Madison
Drexel; Jung; Long; Shew; Spence; Uen

Utah State University
Rowley

Vanderbilt University
Bowers

Virginia Polytechnic Institute and State University
Addington; Miller

Walden University
Conger; Saunders

Washington Sate University
Tusgate; Gupta

Wayne State University
Arnold; Gunasekera; McMann

West Virginia University
Goodwin; Othman; Pyzdrowski; Vavra; Yang

Western Michigan University
Emerson; Royer; Vunovich

Wilmington College (Delaware)
Dudderar; Joyner

Yale University
Ben-Zeev

Research Articles in Mathematics Education Published in 1997

Hea-Jin Lee & S. Asli Özgün-Koca, *The Ohio State University*

This section lists 282 articles in mathematics education research that were published in 1997. Each entry is coded (see *Key to Codes*) with one to three major topic codes (in bold type) and any number of minor topic codes, as well as the grade level code (in parentheses). Studies related to preservice or inservice teacher education are indicated by the appropriate codes (Prsv, Insv). The level designated for teacher education or teacher studies indicates the grade level(s) at which the intern or teacher participants teaches, followed by the level code, "T" for teacher or "TE" for teacher education. All entries are indexed by major codes at the end of the volume (see page 85). A list of the journals searched and the number of articles included from each is provided at the end of this section (see page 70).

Abramovich, Sergei; Nabors, Wanda. (1997). Spreadsheets as generators of new meanings in middle school algebra. *Computers in the Schools*, 13(1-2), 13-25.

This study describes how using spreadsheets helped seventh-grade algebra students develop problem solving skills.

PS, Comp, Alg (MS)

Adams, Paul E.; Krockover, Gerald H. (1997, January). Concerns and perceptions of beginning secondary science and mathematics teachers. *Science Education*, 81(1), 29-50.

This study identifies concerns of beginning science and mathematics teachers about being a new teacher and their perceptions of the effectiveness of their preservice program in relation to their concerns.

Prsv, Tchg, Aff, Curr (T, TE)

Adams, Thomasenia Lott. (1997). Addressing students' difficulties with the concept of function: Applying graphing calculators and a model of conceptual change. *Focus on Learning Problems in Mathematics*, 19(2), 43-57.

This study explored whether a student's use of the graphing calculator during instruction effects their concept of function, how students' participation in a conceptual change assignment effects their concept of function, and how the graphing calculator and the conceptual change assignment interact with one another to influence concept formation.

GCal, Alg, Mscn, Curr (SE, PS)

Adams, Thomasenia Lott. (1997, July-August). Technology makes a difference in community college mathematics teaching. *Community College Journal of Research and Practice*, 21(5), 481-491.

Describes a study that examined three areas (oral interactions, observations, and problem solving investigations) of student assessment in a college algebra classroom before and after the use of graphing calculators in class activities.

Alg, GCal, Assm, PS (PS)

Aksu, Meral. (1997, July-August). Student performance in dealing with fractions. *Journal of Educational Research*, 90(6), (375-380).

This study investigated differences in performance when sixth graders were presented with fractions in three contexts: understanding the meaning of fractions, computation with fractions, and solving word problems with fractions.

Frac, Ach, Curr, Ethn, Tchg (MS)

Allinder, Rose M.; Oats, Robert G. (1997, March-April). Effects of acceptability on teachers' implementation of curriculum based measurement and student achievement in mathematics computation. *Remedial and Special Education*, 18(2), 113-120.

This article presents a study of 12 special education teachers who had a high acceptance of curriculum-based assessment and 9 teachers who had a low acceptance. Results showed that they differed on two of five implementation measures.

Curr, Assm, D/R, Ach, TAtt (EL)

Anderson, Ann. (1997, July). Families and mathematics: A study of parent-child interactions. *Journal for Research in Mathematics Education*, 28(4), 484-511.

This study explores mathematics and parent-child interactions in a group of 21 parents and their four-year-old children. Findings indicate a wide range of mathematics displayed, with counting being the most prevalent activity. All parents succeeded in injecting some mathematics in most sessions.

Soc, Tchg, Knw, Oral (EL)

Andrews, Paul. (1997, October). Information technology in the mathematics national curriculum: Policy begets practice? *British Journal of Educational Technology*, 28(4), 245-256.

A survey of 185 secondary mathematics teachers investigated their perceptions of expertise and curricular justifications for the classroom use of databases, spreadsheets, Logo and BASIC. The study determined that teachers who used software regularly tended to have shorter lengths of service, better qualifications, and were more likely to be male.

Comp, TKnw, Tchg (TE)

Anku, Sitsofe E. (1997, September). Towards a theory-based multi-dimensional framework for assessment in mathematics: The "SEA" framework. *Mathematics Education Research Journal*, 9(2), 236-43.

This study proposes using the reform documents from the National Council of Teachers of Mathematics (NCTM), a theory based multi-dimensional assessment framework, to help expand the scope of assessment in mathematics.

Assm, PS, Curr, Lrng (ALL)

Arsac, Gilbert; Mante, Michel. (1997, June). Situations d'Initiation au raisonnement deductif [Situations of initiation to deductive reasoning]. *Educational Studies in Mathematics*, 33(1), 21-43.

This study examines classroom situations which allow for learning of rules of mathematical reasoning. Findings indicate that debate about mathematical rules can be generated amongst students aged 12 to 13 through the study of a mathematical problem.

PS, Lrng, Mtcg (MS)

Artz, Alice F.; Armour-Thomas, Eleanor. (1997). Mathematical problem solving in small groups: Exploring the interplay of students' metacognitive behaviors, perceptions, and ability levels. *The Journal of Mathematical Behavior*, 16(1), 63-74.

Twenty-seven seventh-grade students of varying ability were observed working in small groups. The results provided insights regarding the ways that beliefs, emotions, and attitudes of students of varying ability influenced their own and their peers' metacognitive behaviors within their respective groups.

PS, Grpg, Mtcg, Blf, Soc (MS)

Asiala, Mark; and others. (1997). Development of students' understanding of cosets, normality, and quotient groups. *The Journal of Mathematical Behavior*, 16(3), 241-309.

An experimental course used increased computer programming activities and other exercises designed to give students the opportunity to build experiences.

Alg, Curr, Comp, Tchg (PS)

Asiala, Mark; and others. (1997). The development of students' graphical understanding of the derivative. *The Journal of Mathematical Behavior*, 16(4), 399-431.

This study focused on the nature and development of college students' mathematical knowledge about derivative. A revised epistemological analysis for the graphical understanding of the derivative based on the results of the data was proposed.

Lrng, Calc (PS)

Aspinwall, Leslie; Shaw, Kenneth L.; Presmeg, Norma C. (1997, September). Uncontrollable mental imagery: Graphical connections between a function and its derivative. *Educational Studies in Mathematics*, 33(3), 301-17.

This study examines the possibility that at times imagery might be a disadvantage in certain tasks and describes one calculus student's images supporting high levels of mathematical functioning which occasionally became so powerful as to obscure more than to explain.

Calc, Vis, Lrng (SE)

Austin, Joe Dan; and others. (1997, January). Integrated mathematics interfaced with science. *School Science and Mathematics*, 97(1), 45-49.

This study describes a Standards-based high school mathematics curriculum that involves application, technology, cooperative learning, and open-ended problem solving and compares student attitudes and achievement with a traditional class.

IC, Att, Ach, PS, Tech, Grpg (HS)

Ball, Deborah Loewenberg. (1997, December). From the general to the particular: Knowing our own students as learners of mathematics. *Mathematics Teacher*, 90(9), 732-37.

This case study focused on the challenge of learning what students know. The author recommends that knowing students is a domain worthy of development which promises increased understanding and consequently new challenges.

TAtt, TKnw (SE, TE)

Barak, Moshe; Waks, Shlomo. (1997, June). An Israeli study of longitudinal in service training of mathematics, science, and technology teachers. *Journal of Education for Teaching*, 23(2), 179-190.

To improve science, mathematics, and technology education, Israeli high school teachers received inservice training. Surveys, reports, observations, meetings, and student achievement tests indicated that the program was useful for teachers who had acquired basic knowledge in their disciplines.

TKnw, Insv (TE, SE)

Batanero, Carmen; and others. (1997, February). Effect of the implicit combinatorial model on combinatorial reasoning in secondary school pupils. *Educational Studies in Mathematics*, 32(2), 181-99.

The main goal of this research was to determine the effect of the implicit combinatorial model on pupils' combinatorial reasoning before and after instruction. This study gives an analysis of variance of the answers from 14-15 year-old students (n=720).

PS, Prob, Rep (SE)

Bauersfeld, Heinrich. (1997, November). Research in mathematics education: A well-documented field? *Journal for Research in Mathematics Education*, 28(5), 612-25.

Author reviews the four sections of the two-volume set, International Handbook of Mathematics Education, with specific comments on various chapters contained therein. Author suggests that this handbook be used as a general resource for specific topics.

Tchg, Revw, Tchr, Matl (ALL, TE)

Behr, Merlyn J.; and others. (1997, January). Conceptual units analysis of preservice elementary school teachers' strategies on a rational-number-as-operator task. *Journal for Research in Mathematics Education*, 28(1), 48-69.

This is a study of preservice teachers (n=30) that provides confirming evidence that students usually use two rational number operator constructs. Authors discuss the cognitive models of the students' strategies and the notational system used as an analytical tool.

Prsv, Frac, TKnw, Lrng (PS)

Belfiore, Phillip J.; Lee, David L.; Vargas, Andres U. (1997, Summer). Effects of high preference single digit mathematics problems completion on multiple digit mathematics problem performance. *Journal of Applied Behavior Analysis*, 30(2), 327-330.

A study of two adolescents with behavior disorders examined the effects of a sequence of three, single digit multiplication problems on the latency to initiate multiple digit multiplication problems.

D/R, M/D, Assm (SE)

Bennett, Randy Elliot; and others. (1997, Sum). Evaluating an automatically scorable, open-ended response type for measuring mathematical reasoning in computer adaptive tests. *Journal of Educational Measurement*, 34(2), 162-176.

Scoring accuracy and item functioning were studied for an open-ended response type test in which correct answers can take many different surface forms. Results with 1,864 graduate school applicants showed automated scoring to approximate the accuracy of multiple choice scoring.

Assm, PS, Comp (PS)

Bennett, Randy Elliot; Sebrechts, Marc M. (1997, Spring). A computer based task for measuring the representational component of quantitative proficiency. *Journal of Educational Measurement,* 34(1), 64-77.

A computer-delivered problem solving task based on cognitive research literature was developed and its validity for graduate admissions assessment was studied with 107 undergraduates. Findings supported use of the test, which asked examinees to sort word problem stems by prototypes.

PS, Assm, Lrng (PS)

Berenson, Sarah B. (1997). Language, diversity, and assessment in mathematics learning. *Focus on Learning Problems in Mathematics,* 19(4), 1-10.

This study examines the theoretical framework of psychologist Lev Vygotsky with regard to communication tools, cognition, and socio-cultural effects on these tools by adapting Luria's instruments for alternative assessments to study students' word meanings of division.

Ethn, Lang, M/D, Soc, Assm, Lrng (ALL)

Bers, Trudy. (1997, Spring). Self assessments, academic skills, and student achievement. *Journal of Applied Research in the Community College,* 4(2), 101-117.

A study of how student characteristics, self perceptions, academic skills, and course-taking patterns can predict academic achievement showed that students have unrealistic perceptions of their own academic competency and that mathematics skills are a stronger predictor of academic achievement than verbal skills.

Ach, Att, Assm, D/R (PS)

Bessant, Kenneth C. (October, 1997). The development and validation of scores on the mathematics information processing scale (MIPS). *Educational & Psychological Measurement,* 57(5), 841-857.

This study reports on the development and psychometric properties of a new 87-item Mathematics Information Processing Scale that explores learning strategies, metacognitive problem-solving skills, and attentional deployment. Results with 340 college students support the use of the instrument.

PS, Mtcg, Styl, Rsch (ALL)

Bewick, Viv; Southern, Jane. (1997, June). Factors influencing students' choice of mathematics at A-Level. *Teaching Mathematics and Its Applications,* 16(2), 74-78.

Questionnaires (n=198) given to find reasons for students choosing A-level mathematics and the relationship between gender and A-level choices found a highly significant difference between boys and girls in why they choose mathematics.

Gend, Att, Curr (ALL)

Birenbaum, Menucha; and others. (1997, August). On agreement of diagnostic classifications from parallel subtests: Score reliability at the micro level. *Educational and Psychological Measurement,* 57(4), 541-558.

The agreement of diagnostic classifications from two parallel subtests assessing a mathematics skill was studied with 431 Arab Israeli 10th graders. Even when parallel form reliability was high, less agreement was apparent when performance is evaluated at the micro level.

Ethn, Assm, Rsch (HS)

Boaler, Jo. (1997, November). Equity, empowerment and different ways of knowing. *Mathematics Education Research Journal,* 9(3), 325-42.

This study emphasizes that a project-based approach produced equity between girls and boys whereas a textbook approach prompted many of the girls to underachieve.

Eqty, Tchg, Gend, Matl (ALL)

Boaler, Jo. (1997, September). Reclaiming school mathematics: The girls fight back. *Gender and Education,* 9(3), 285-305.

Case study data from two British schools for grades 9 through 11 (160 students and 109 students) shows the way in which girls link their mathematics underachievement to the type of mathematics that is commonly taught in the United Kingdom.

Gend, Ach, Curr, Ethn (HS)

Borko, Hilda; and others. (1997, April). Teachers' developing ideas and practices about mathematics performance assessment: Successes, stumbling blocks, and implications for professional development. *Teaching and Teacher Education*, 13(3), 259-278.

Examined the change process experienced by 14 third-grade teachers participating in the University of Colorado Assessment Project, which helped teachers design and implement classroom-based performance assessments compatible with their mathematics and literacy instructional goals.

Tatt, Assm, NSns, Insv (EL, TE)

Boulton-Lewis, Gillian; and others. (1997). Processing load and the use of concrete representations and strategies for solving linear equations. *The Journal of Mathematical Behavior*, 16(4), 379-397.

A qualitative analysis of the responses revealed that students did not use materials in solving problems. The increased processing load caused by concrete representations is hypothesized as a reason.

Matl, Rep, Alg, PS (SE)

Boulton-Lewis, Gillian; Wilss, Lynn; Mutch, Sue. (1997, September). Analysis of primary school children's abilities and strategies for reading and recording time from analogue and digital clocks. *Mathematics Education Research Journal*, 9(2), 136-51.

The sequence of time acquisition in the ability to read and record analogue and digital times proposed in this study was confirmed for grades 1-3 (n=67) while irregularities occurred with grades 4-6 (n=66).

Tchg, Meas (EL)

Brandell, Gerd; Carlsson, Svante; Eklbom, Hakan; Nord, Ann-Charlotte. (1997, November). Encouraging more women into computer science: Initiating a single-sex intervention program in Sweden. *Mathematics Education Research Journal*, 9(3), 312-24.

Success in a new program in computer science and engineering, heavily based on applied mathematics and only open to women, required considerable interest in mathematics and curiosity about computer science among female students at the secondary level.

Gend, Comp, Att, Ethn, Curr (ALL)

Brenner, Mary E.; and others. (Winter, 1997). Learning by understanding: The role of multiple representations in learning algebra. *American Educational Research Journal*, 34(4), 663-689.

Treatment students were more successful in representing and solving a function word problem and were better at problem representation tasks such as translating word problems into tables and graphs than were comparison students.

Alg, Lrng, Rep (HS)

Brookhart, Susan M. (1997, July-August). Effects of the classroom assessment environment on mathematics and science achievement. *Journal of Educational Research*, 90(6), 323-330.

Data were obtained from the 1987 and 1991 Longitudinal Study of American Youth. Beyond the expected effects of gender, socioeconomic status, reading ability, and prior achievement, homework effects were found for mathematics achievement.

Ach, Soc, Assm (SE)

Brown, Anne; DeVries, David J.; Dubinsky, Ed; Thomas, Karen. (1997). Learning binary operations, groups, and subgroups. *The Journal of Mathematical Behavior*, 16(3), 187-239.

This paper examines how abstract algebra students might come to understand binary operations, groups, and subgroups. Results suggest that the pedagogical approach of the study was reasonably effective in helping students to develop strong conceptions.

Alg, Lrng, Tchg (PS)

Brown, Dawn L.; Wheatley, Grayson H. (1997). Components of imagery and mathematical understanding. *Focus on Learning Problems in Mathematics*, 19(1), 45-70.

Investigation of students' use of imagery in their mathematical activities found image formation was crucial in doing mathematics.

PS, Lrng, Vis (EL)

Brown, Michael T.; and others. (1997, June). Traditionality and the discriminating effect of expectations of occupational success and occupational values for women within math oriented fields. *Journal of Vocational Behavior,* 50(3), 418-431.

A study of women majoring in engineering (n=31) and mathematics education (n=43) showed the following variables distinguished between the two groups: success expectations for traditional and nontraditional occupations, self efficacy for traditional occupations, and outcome desirability.

Gend, Att, Blf (PS)

Brown, Susan Wightman; Jurney, Mary Ann. (1997, March). Buddy classes. *Science Scope,* 20(6), 55-57.

A partnership project, in which each fourth and fifth grade classroom of an elementary school had a "buddy class" at a neighboring middle school, increased students' mathematics and science skills and self-esteem.

Lrng, Grpg, PS, Att (ALL)

Bruno, Alicia; Espinel, Maria Candelaria; Martinon, Antonio. (1997). Prospective teachers solve additive problems with negative numbers. *Focus on Learning Problems in Mathematics,* 19(4), 36-55.

This study analyzes the solution of additive problems involving negative numbers by prospective primary school teachers using surveys. Students felt no need to use negative numbers in the solution of additive problems.

A/S, TKnw, NSns (T, TE)

Brush, Thomas A. (1997, Fall). The effects of group composition on achievement and time on task for students completing ILS activities in cooperative pairs. *Journal of Research on Computing in Education,* 30(1), 2-17.

This article discusses a computer-assisted instruction study that examined the impact of group composition on student achievement, time on task, and group interactions when completing Integrated Learning Systems mathematics activities in cooperative pairs.

CAI, Grpg (EL)

Brush, Thomas A. (1997). The effects on student achievement and attitudes when using Integrated Learning Systems with cooperative pairs. *Educational Technology Research and Development,* 45(1), 51-64.

Fifth-grade students using Integrated Learning Systems in cooperative groups for mathematics instruction performed better and were more positive toward mathematics.

Ach, Comp, Grpg, Att (EL)

Byrnes, James P.; Hong, Li; Xing, Shaoying. (1997, October). Gender differences on the math subtest of the Scholastic Aptitude Test may be culture-specific. *Educational Studies in Mathematics,* 34(1), 49-66.

Chinese students were given items from the mathematics subtest of the Scholastic Aptitude Test found to produce the largest gender differences in American students. Results revealed no difference in performance on the test items between Chinese males and females.

Gend, CC, Assm (ALL)

Cai, Jinfa. (1997, Spring). Beyond computation and correctness: Contributions of open ended tasks in examining U.S. and Chinese students' mathematical performance. *Educational Measurement: Issues and Practice,* 16(1), 5-11.

The contributions of open-ended tasks in examining students' mathematical performance were studied with 250 U.S. and 425 Chinese sixth graders. Open-ended tasks allow for analysis of student performance that cannot be assessed solely by percent correct or incorrect.

CC, Assm, Ethn (MS)

Callingham, Rosemary A. (1997, September). Teachers' multimodal functioning in relation to the concept of average. *Mathematics Education Research Journal,* 9(2), 205-24.

This study analyzes the responses of pre- and in-service teachers (n=136) to a series of graded questions about average by presenting information in graphical form requiring respondents to compare data sets.

TKnw, Rep, Stat, PS (PS, T)

Campbell, Patricia B.; Sanders, Jo. (1997, January-February). Uninformed but interested: Findings of a national survey on gender equity in preservice teacher education. *Journal of Teacher Education*, 48(1), 69-75.

This article reports a study of how instructors in methods classes in mathematics, science, and technology addressed issues of gender equity. Results indicated that the teacher educators were interested but uninformed.

Tchg, Gend, Eqty, TAtt (TE)

Carlson, Marilyn P. (1997). Obstacles for college algebra students in understanding functions: What do high-performing students really know? *AMATYC Review*, 19(1), 48-59.

This article reports the results of an investigation to provide insights into how high-performing college algebra students (n=30) develop an understanding of major aspects of the concept of function. High-performing students actually possessed weak understanding.

Alg, Knw (PS)

Carr, Martha; Jessup, Donna L. (1997, June). Gender differences in first grade mathematics strategy use: Social and metacognitive influences. *Journal of Educational Psychology*, 89(2), 318-328.

A study of social and metacognitive contributors to gender differences in 58 first-graders found girls were more likely to use overt strategies, while boys use memory retrieval, to solve addition and subtraction problems.

Gend, Mtcg, Soc, A/S (EC)

Carroll, William M. (1997, March). Results of third-grade students in a reform curriculum on the Illinois State Mathematics Test. *Journal for Research in Mathematics Education*, 28(2), 237-42.

Only 2% third-grade Illinois students using the University of Chicago School Mathematics Project's elementary curriculum, Everyday Mathematics, failed to meet state goals.

Curr, Ach, NSns (EL)

Carroll, William M.; Porter, Denise. (1997, March). Invented strategies can develop meaningful mathematical procedures. *Teaching Children Mathematics*, 3(7), 370-74.

Classroom observation of primary students encouraged to develop computational procedures that are meaningful to them revealed most students capable of developing their own accurate solution procedures.

PS, Lrng, Tchg (EL)

Casey, M. Beth; and others. (1997, July). Mediators of gender differences in mathematics college entrance test scores: A comparison of spatial skills with internalized beliefs and anxieties. *Developmental Psychology*, 33(4), 669-680.

This study used path analysis to examine effects of spatial skill, mathematics anxiety, and mathematics self confidence as mediators of gender differences in mathematics Scholastic Aptitude Test (SAT M) in upper third of college-bound adolescents.

Vis, Anx, Gend (HS)

Cawley, John F.; Shepard, Teri; Smith, Maureen; Parmar, Rene S. (1997, Spring). Item mass and complexity and the arithmetic computation of students with learning disabilities. *Learning Disabilities: A Multidisciplinary Journal*, 8(2), 97-107.

The performance of 76 students with learning disabilities (aged 10 to 15) on four tasks of addition, subtraction, multiplication, and division computation was examined. Tasks varied in difficulty level and number of strokes needed to complete all items.

Arth, D/R (K-12)

Chandler, Sue. (1997, March). A comparison of public expectation of achievement in mathematics in England and Wales and Bavaria—A personal view. *Teaching Mathematics and Its Applications*, 16(1), 5-12.

This study compares the public expectation of achievement in mathematics in England, Wales, and Bavaria.

CC, Ach, Assm, Matl (SE)

Chapman, Anne. (1997, September). Towards a model of language shifts in mathematics learning. *Mathematics Education Research Journal*, 9(2), 152-73.

This article reports a study of the relationship between language and learning in school mathematics. This study proposes a model where mathematical meanings are constructed within the shift towards increasingly mathematical language.

Lang, Lrng (ALL)

Chapman, Olive. (1997, March). Metaphors in the teaching of mathematical problem solving. *Educational Studies in Mathematics*, 32(3), 201-28.

This study focused on three teachers and their ways of teaching problem solving. Findings indicate that the participants unconsciously constructed personal metaphors that became the basis of their conceptualization of problems.

PS, TKnw, Tchg (T)

Choi, Jeong Im; Hannafin, Michael. (1997). The effects of instructional context and reasoning complexity on mathematics problem solving. *Educational Technology Research and Development*, 45(3), 43-55.

Results suggest that rich mathematical instructional contexts best support mathematics problem solving, but simple, decontextualized instruction yields the most favorable attitudes of fifth-grade students.

Tchg, PS, Att (MS)

Christiansen, Iben Maj. (1997, October). When negotiation of meaning is also negotiation of task: Analysis of the communication in an applied mathematics high school course. *Educational Studies in Mathematics*, 34(1), 1-25.

The negotiation of meaning presupposes a taken-to-be-shared understanding of a situation. The article illustrates how negotiation of meaning and task may be linked in ways inappropriate to the learning of modeling and critical reflections.

Comm, ClIn, Tchg, Rep (HS)

Clark, Julie; and others. (1997). Constructing a schema: The case of the chain rule? *The Journal of Mathematical Behavior*, 16(4), 345-364.

This study focuses on the nature and development of college students' mathematical knowledge about the chain rule. Proposed revised epistemological analysis of the chain rule based on the results of the data is presented.

Lrng, Calc (PS)

Clarke, Doug M. (1997, May). The changing role of the mathematics teacher. *Journal for Research in Mathematics Education*, 28(3), 278-308.

Author investigates changing teacher roles associated with two sixth-grade teachers' use of innovative mathematics materials. One teacher demonstrated increasing comfort in posing non-routine problems to students.

Matl, TAtt, Tchr, PS (T, MS)

Clements, Douglas H.; and others. (1997, January). Students' development of length concepts in a Logo-based unit on geometric paths. *Journal for Research in Mathematics Education*, 28(1), 70-95.

This study of third grade students (n=38) investigated the development of linear measurement concepts. Students who connected numeric and spatial representations proved to be the better problem solvers.

PS, CAI, Meas, Rep (EL)

Clements, Douglas H.; Battista, Michael T.; Sarama, Julie; Swaminathan, Sudha. (1997, November). Development of students' spatial thinking in a unit on geometric motions and area. *Elementary School Journal*, 98(2), 171-186.

This study found strong positive effects on the transformation of internalized images and initial gender differences in spatial thinking, but both boys and girls made substantial gains during instruction.

Vis, Gend, Geom (EL)

Cobb, Paul; and others. (1997, May). Reflective discourse and collective reflection. *Journal for Research in Mathematics Education*, 28(3), 258-77.

This study explores the relationship between classroom discourse and mathematical development in a first-grade classroom. It contrasts the analysis of reflective discourse with

Vygotskian accounts of learning that also stress the importance of social interaction and semiotic mediation.

Oral, Tchg, Clln, Lrng, Mtcg (EL)

Conrad, Joseph F. (1997). A classroom experiment using small-group projects. *The Journal of Mathematical Behavior,* 16(2), 167-180.

This article reports findings from a study which applied the group project method to a college algebra class. The results showed that the experiment did not produce success for the group-projects approach.

Grpg, Alg, Tchg (PS)

Cooley, Laurel A. (1997, December). Evaluating student understanding in a calculus course enhanced by a computer algebra system. *PRIMUS,* 7(4), 308-16.

This article describes an experimental study in which two sections of calculus were taught using the same materials, with one section was enhanced with the computer algebra system Mathematica. Students in the technology group had advantages to understanding certain key topics in calculus such as limits, derivatives, and curve sketching.

Calc, Comp, Tchg, Curr (PS)

Croucher, Richard; Houssart, Jenny. (1997, June). Who's Counting? *Adults Learning (England),* 8(10), 270-272.

The mathematical performance of (n=30) 18-20 year olds and (n=37) adult students studying elementary education was compared. Older students did slightly better; adults without a mathematics background or who had previous negative mathematics experiences did very well.

Ach, Anx, Lrnr, Prsv (PS)

Crowe, David; Zand, Hossein. (1997, January). Novices entering Mathematics-I. The impact of new technology. *Computers & Education,* 28(1), 43-54.

Reports the results of a case study at the Open University (Great Britain) which shows that the learning environment for distance education students of mathematics can be substantially improved by the use of electronic communication.

Comp, Comm (PS)

Cunningham, Richard. (1997). With a little help. *Lamp,* 79(2), 2-3.

This article describes a volunteer tutoring program coordinated by associates of the Exxon Corporation to help middle and high school students with mathematics and science homework. The author enumerates the successes of the tutoring program.

Soc, Tchg, Tech, Ach (SE)

d'Ailly, Hsiao H.; Simpson, Jacque; MacKinnon, G. E. (1997, September). Where should "You" go in a math compare problem? *Journal of Educational Psychology,* 89(3), 562-567.

The cognitive effects of self referencing in mathematical word problems were studied in (n=100) third-, fourth-, and fifth graders solving compare unknown and referent unknown problems. In general, self referencing (referring to "you") facilitated encoding processes in solving these problems.

PS, Lrng, Comm (EL)

Dahlberg, Randall P.; Housman, David L. (1997, September). Facilitating learning events through example generation. *Educational Studies in Mathematics,* 33(3), 283-99.

This study concluded that students who used an example generation learning strategy were more effective in attaining an initial understanding of a new concept than those using other strategies.

Lrng, Ach, Tchg (SE)

Davis, Brent. (1997, May). Listening for differences: An evolving conception of mathematics teaching. *Journal for Research in Mathematics Education,* 28(3), 355-76.

This study highlights the manner in which the teacher listens as a metaphoric lens through which to reinterpret practice, both as a practical basis for teaching action, and as a means of addressing critics' concerns.

Tchg, Tchr, Clln (T)

Deblois, Lucie. (1997, October). Trois eleves en difficulte devant des situations de reunion et de complement d'Ensembles [Three students facing difficulty in problems involving combination and complementation]. *Educational Studies in Mathematics,* 34(1), 67-96.

This study analyzed three children's initial mental representations, procedures, and reflections when presented with four different situations. The article discusses ways to improve children's understanding of problems involving combination and complementation.

Styl, NSns, Rep (El)

DeFranco, Thomas C.; Curcio, Frances R. (1997). A division problem with a remainder embedded across two contexts: Children's solutions in restrictive vs. real-world settings. *Focus on Learning Problems in Mathematics*, 19(2), 58-72.

This article discusses an exploratory study that examined students' interpretation of remainders in division as applied to word problems in a restrictive school setting and in a real-world, out-of-school setting. This study concluded that students lack the ability to map computational results to the real-world context.

M/D, PS, Soc, Assm, Styl (EL)

Dembo, Yoram; and others. (1997, January). A comparison of the geometric reasoning of students attending Israeli ultraorthodox and mainstream schools. *Developmental Psychology*, 33(1), 92-103.

Results suggested that mainstream students did better on the misconception task, but the advantage of the mainstream students was limited to mathematics. Factors of both mainstream and orthodox schooling may have contributed to these findings.

Geom, PS, Ethn (K-12)

Demby, Agnieszka. (1997, June). Algebraic procedures used by 13-to-15-year-olds. *Educational Studies in Mathematics*, 33(1), 45-70.

This study investigated different types of procedures used by students (n=108) to simplify certain algebraic expressions. Findings indicated seven types of procedures including automatization, formulas, guessing-substituting, preparatory modification, concretization, rules, and quasi-rules.

Styl, Alg, Ethn (HS)

Di Pillo, Mary Lou; and others. (1997, March-April). Exploring middle graders' mathematical thinking through journals. *Mathematics Teaching in the Middle School*, 2(5), 308-14.

In a project involving student journal writing designed to examine middle graders' mathematical thinking and disposition, teachers gained insight into students' conceptual and procedural knowledge and attitudes toward mathematics.

Writ, Att, Ach, Lrng, Curr (MS)

DiCintio, Matthew J.; Stevens, Robert J. (1997, Spring). Student motivation and the cognitive complexity of mathematics instruction in six middle grades classrooms. *Research in Middle Level Education Quarterly*, 20(3), 27-42.

This study examined the relationship between cognitive demands of instruction and student motivation in fifth-, sixth-, and seventh-grade mathematics classrooms and found through observation and survey data that sixth- and seventh-grade mathematics lessons were characterized by significantly fewer elements of higher-order thinking than fifth-grade mathematics lessons.

Att, Tchg (MS)

Didion, Catherine Jay. (1997, November). A report card on gender equity on the twenty-fifth anniversary of Title IX. *Journal of College Science Teaching*, 27(2), 97-98.

The Association for Women in Science, in conjunction with the National Coalition for Women and Girls in Education, published a report card on how women have fared over the past 25 years since the passage of Title IX. The report card gave mathematics and science a C+.

Eqty, Gend (ALL)

Dowker, Ann. (1997). Young children's addition estimates. *Mathematical Cognition*, 3(2), 141-154.

This study assessed the competence of children (n=215) between the ages of five and nine at addition by asking them to estimate answers to addition sums. Children at higher levels tended to produce more reasonable estimates than children at lower levels.

Est, A/S (EC)

Driessen, Geert W. J. M. (1997, July). Pre-reading and pre-arithmetic instruction in infant education in the Netherlands: A multilevel analysis approach. *Early Child Development and Care*, 134, 1-21.

This study examined whether students' prereading and prearithmetic test results varied as a result of the teaching strategy used. Subjects were (n=446) teachers and (n=5,490) children, 4-6 years old, from Dutch infant classes 1 and 2 of primary education. Socioethnic background was found to be more significant in explaining test results than teaching method.

Soc, Tchg (EC)

Dubinsky, Ed. (1997). On learning quantification. *Journal of Computers in Mathematics and Science Teaching*, 16(2-3), 335-62.

This study of students learning concepts of universal and existential quantification in undergraduate mathematics courses in which the instruction was based on previous research into what it means to understand this concept found that students tended to make more effective mathematical constructions in their minds.

Comp, Lrng, Tchg (PS)

Duffy, Jim; Gunther, Georg; Walters, Lloyd. (1997, October). Gender and mathematical problem solving. *Sex Roles: A Journal of Research*, 37(7-8), 477-494.

This article studied the relationship between gender and mathematical problem solving in (n=83) male and (n=76) female high-achieving Canadian 12-year-olds. Gender differences were found on the Canadian Test of Basic Skills but not on the GAUSS assessment.

PS, Gend (MS)

Elliott, Alison; Hall, Neil. (1997). The impact of self regulatory teaching strategies on "at risk" preschoolers' mathematical learning in a computer mediated environment. *Journal of Computing in Childhood Education*, 8(2-3), 187-198.

This study examined effects of a self-regulatory teaching approach in a computer context on mathematics learning of at-risk preschoolers. Researchers found that computer-based contexts provided at-risk children with an effective context for learning mathematics.

Comp, Tchg, Ethn, PS, Soc (EC)

Elmore, Richard F. (1997). The politics of education reform. *Issues in Science and Technology*, 14(1), 41-49.

Author makes recommendations based on the Third International Mathematics and Science Study (TIMSS), focusing on insights that educators in the United States should glean from an examination of the study.

Assm, Ach, CC, Tchg, Curr, Revw (K-12)

Engelbrecht, J.C. (1997). Academic support in mathematics in a third world environment. *Journal of Computers in Mathematics and Science Teaching*, 16(2-3), 323-33.

This article presents a computerized bridging course in mathematics developed as part of an academic support program. The author discusses the didactical approach of the system—criterion-referenced or mastery learning—in which student progress depends strictly on proven mastery of the concepts.

CAI, Curr, Soc (PS)

English, Lyn D. (1997, December). The development of fifth-grade children's problem-posing abilities. *Educational Studies in Mathematics*, 34(3), 183-217.

This study investigated the extent to which children's number sense and novel problem-solving skills govern their problem-posing abilities in routine and nonroutine situations. Children who participated in the program appeared to show substantial developments in each of the program components in contrast to those who did not participate.

PS, NSns, Mtcg (MS)

Evensky, Jerry; Kao, Duke; Yang, Qing; Fadele, Remi; Fenner, Richard. (1997, September-October). Addressing prerequisite mathematics needs—A case study in introductory economics. *International Journal of Mathematical Education in Science and Technology*, 28(5), 629-39.

This article describes a model for addressing prerequisite mathematics needs. A small set of prerequisite skills for the content course is identified, assessed, and students needing extra help are assisted. Targeted students include those with only marginal deficits rather than those needing full course remediation.

Ach, Knw, Lrng, Assm (PS)

Falk, Ruma; Konold, Clifford. (1997, April). Making sense of randomness: Implicit encoding as a basis for judgment. *Psychological Review,* 104(2), 301-318.

Results of three studies, involving (n=606) high school and college students, showed that the perceived randomness of a sequence is better predicted by its encoding difficulty than its objective randomness. Results imply that judging the extent of randomness of a sequence is based on the attempt to encode it.

PS (HS, PS)

Fast, Gerald R. (1997). Using analogies to overcome student teachers' probability misconceptions. *The Journal of Mathematical Behavior,* 16(4), 325-344.

Surveys of (n=24) secondary mathematics student teachers and follow-up interviews with (n=15) volunteers indicated that anchoring situations could be effectively utilized in overcoming probability misconceptions when the participants were engaged in a process of analogical reasoning.

Prob, Mscn, Stat, Prsv (SE, T)

Fauvel, John; van Maanen, Jan. (1997, May). The role of the history of mathematics in the teaching and learning of mathematics. *Mathematics in School,* 26(3), 10-11.

The authors discuss the research questions addressed in a study set by the International Commission on Mathematics Instruction focusing on the role of the history of mathematics in improving the teaching and learning of mathematics.

Curr, Revw, CC (ALL)

Fischbein, Efraim; Grossman, Aline. (1997, October). Schemata and intuitions in combinatorial reasoning. *Educational Studies in Mathematics,* 34(1), 27-47.

This study analyzed the hypothesis that intuitions are always based on certain structural schemata. Authors conclude that intuitions, even when expressed as instantaneous guesses, are in fact manipulated behind the scenes by schemata.

Lrng, Prob (ALL)

Fischbein, Efraim; Schnarch, Ditza. (1997, January). The evolution with age of probabilistic, intuitively based misconceptions. *Journal for Research in Mathematics Education,* 28(1), 96-105.

This is a study that investigated probabilistic intuitions held by students (n=98) from grade 7 through college through the use of a questionnaire. Of the misconceptions that were investigated, availability was the only one that was stable across age groups.

Prob, Mscn, Knw (HS, PS)

FitzSimons, Gail E. (1997, November). Gender issues in adult and vocational mathematics education. *Mathematics Education Research Journal,* 9(3), 292-311.

This article provides a critical analysis of some of the social and political contexts of mathematics education in the adult and vocational education and training sectors with particular reference to gender issues.

Soc, Gend, Revw (PS)

Fleener, M. Jayne; Dupree, Gloria Nan; Craven, Lary D. (1997, September). Exploring and changing visions of mathematics teaching and learning: What do students think? *Mathematics Teaching in the Middle School,* 3(1), 40-43.

Students in mathematics classrooms were asked to select cartoons that best depicted their visions of typical and ideal mathematics classrooms. Many students picked the model of teacher as sage-on-the-stage as ideal.

Soc, Att (SE)

Fouad, Nadya A.; Smith, Philip L.; Enochs, Larry. (1997, April). Reliability and validity evidence for the middle school elf efficacy scale. *Measurement and Evaluation in Counseling and Development,* 30(1), 17-31.

This article provides validity evidence for a new instrument that assesses career-related self efficacy intervention for Hispanic and Latino students and focuses on the broad area of career decision making and on mathematics and science tasks. Results indicated adequate validity of the instrument, particularly for women and minority students.

Blf, Soc, Rsch (MS)

Fouche, Katheryn K. (1997, February). Algebra for everyone: Start early. *Mathematics Teaching in the Middle School,* 2(4), 226-29.

This article describes an action research project conducted in eighth-grade algebra and pre-algebra classes. The author suggests ways in which students can use their creativity to progress from a simple solution method to a method that produces a generalization and a formula.

Lrng, Alg, Manp (SE)

Franke, Megan Loef; Carey, Deborah A. (1997, January). Young children's perceptions of mathematics in problem-solving environments. *Journal for Research in Mathematics Education,* 28(1), 8-25.

This study explored the perceptions that children (n=36) have about what it means to engage in mathematics. The study took place in reform-minded classrooms and found that children have a variety of perceptions and most do not feel that success is determined by speed and accuracy.

Blf, PS, **Tchg (EL)**

Fuchs, Lynn S.; and others. (1997, January). Enhancing students' helping behavior during peer mediated instruction with conceptual mathematical explanations. *Elementary School Journal,* 97(3), 223-249.

This study explored methods for helping students generate conceptual mathematical explanations during peer-mediated learning activities and found that students with training in giving conceptual explanations had highest achievement levels.

Tchg, Grpg, Ach (K-12)

Fuchs, Lynn S.; Fuchs, Douglas; Karns, Kathy; Hamlett, Carol L.; Katzaroff, Michelle; Dutka, Suzanne. (1997, Fall). Effects of task focused goals on low achieving students with and without learning disabilities. *American Educational Research Journal,* 34(3), 513-543.

The effects of a task focused goals (TFG) treatment in mathematics were studied with low achieving students with or without learning disabilities. Results with 40 elementary classrooms showed that TFG students enjoyed the approach, but that increased effort was associated with greater learning only for those without learning disabilities.

Ach, LD, Curr (EL)

Fuller, Roberta A. (1997, Spring). Elementary teachers' pedagogical content knowledge of mathematics. *Mid Western Educational Researcher,* 10(2), 9-16.

Twelve open-ended questions, administered to (n=28) experienced elementary teachers and (n=26) education majors, examined mathematical content knowledge and related pedagogical knowledge. Results suggest that pedagogical knowledge related to specific content is not necessarily acquired through teaching experience.

TKnw, Geom, Frac (EL, TE)

Fuson, Karen C.; Smith, Steven T.; LoCicero, Ana Maria. (1997, December). Supporting Latino first graders' ten-structured thinking in urban classrooms. *Journal for Research in Mathematics Education,* 28(6), 738-66.

This report of a year-long classroom teaching experiments in two predominantly Latino low-socioeconomic-status (SES) urban classrooms sought to support first graders' thinking of 2-digit quantities as tens and ones. Performance was substantially above that of some U.S. students of higher SES.

Ethn, Curr, PlcV, Rep (EC)

Gal-Ezer, Judith; Lichtenstein, Orna. (1997). A mathematical-algorithmic approach to sets: A case study. *Mathematics and Computer Education,* 31(1), 33-42.

This study shows by means of a mathematical example how algorithmic thinking and mathematical thinking complement each other. An algorithmic approach can lead to questions that deepen the understanding of mathematics material.

Alg, Lrng, PS (PS)

Ganter, Susan L. (1997, November-December). Impact of calculus reform on student learning and attitudes. *AWIS Magazine,* 26(6), 10-15.

This study considers the results of a study supported by the American Educational Research Association (AERA) and the National Science Foundation (NSF) that focuses on the impact of different environments on students' abilities to learn calculus.

Calc, Soc, Ach, Att (PS)

Gay, A. Susan; Aichele, Douglas B. (1997, January). Middle school students' understanding of number sense related to percent. *School Science and Mathematics,* 97(1), 27-36.

This study examined (n=199) middle school students' understanding of percent, focusing on number sense. Students performed better interpreting a quantity expressed as a percent given a pictorial continuous region than when a pictorial discrete set of circles was given.

NSns, RaPc, Knw, Rep (MS)

Geddis, Arthur N.; Wood, Eric. (1997, August). Transforming subject matter and managing dilemmas: A case study in teacher education. *Teaching and Teacher Education,* 13(6), 611-626.

This study explores the utility of L. S. Shulman's view of teaching as the transformation of subject matter in the context of a preservice secondary mathematics methods course. The paper elaborates Shulman's view, discussing the context of the study, then presenting a case study of a seminar on lesson planning.

TKnw, Tchg, Tchr (TE, SE)

Gottschalk, Molly E.; and others. (1997, April). Metapragmatic awareness of explanation adequacy II: Follow up. *Language, Speech, and Hearing Services in Schools,* 28(2), 108-114.

Evaluation six months following metapragmatic training of (n=13) third-grade students found that students who had received training in explanation adequacy maintained their understanding of the inadequacy of providing only the answer when explaining mathematics problems.

Comm, Tchg, Mtcg (EL)

Graham, Ted. (1997, March). The ways in which different students respond to the same mathematical modelling problem. *Teaching Mathematics and Its Applications,* 16(1), 19-22.

This is a report on the responses obtained when the same mathematical modeling problem was presented to approximately 300 students with similar backgrounds and mathematical experiences. Findings indicate a variety of approaches and a tendency to consistently underestimate the solution to the problem.

PS, Lrnr (SE)

Graham, Theresa A.; Nash, Cindy; Paul, Kim. (1997, Fall). Young children's exposure to mathematics: The child care context. *Early Childhood Education Journal,* 25(1), 31-38.

This study observed and interviewed four preschool teachers to identify contributions of child care experiences to young children's mathematics understanding. It found that programs did not differ in amount or content of mathematics presented to children.

Tchg, Curr (EC)

Grassl, Richard; Mingus, Tabitha. (1997). Using technology to enhance problem solving and critical thinking skills. *Mathematics and Computer Education,* 31(3), 293-300.

Secondary mathematics teachers participated in a problem-solving course in which technology became a means to improve as teachers and as problem solvers. Findings indicate a delineation between technical competence and metatechnology—thinking about how and when to apply technology to particular problems.

Insv, Tech, PS, Tknw (SE, T)

Gutstein, Eric; Lipman, Pauline; Hernandez, Patricia; de los Reyes, Rebeca. (1997, December). Culturally relevant mathematics teaching in a Mexican American context. *Journal for Research in Mathematics Education,* 28(6), 709-37.

This study examined mathematics instruction and its intersection with culturally relevant teaching in an elementary/middle school in a Mexican-American community.

Ethn, Ach, Tchg (EL, MS)

Haeck, Wim; and others. (1997, June). A developmental approach to mathematics testing for university admissions and course placement. *Educational Studies in Mathematics*, 33(1), 71-91.

This study focuses on reasons for the development of a mathematics test for admission of African students from grossly under-resourced schools as well as for placing students into a diversified first-year curriculum. This report highlights the process by which the test questions were developed and piloted.

Assm, Ach, Ethn, Rsch (PS)

Harris, Jacqueline. (1997, September). Problem solving with Franklin the turtle. *Teaching Children Mathematics*, 4(1), 24-27.

This article describes a literature-based approach to helping primary students become more proficient problem solvers in mathematics. Literature-based activities were chosen to develop a sense of community in the classroom. This enabled students to develop the self-confidence to share thoughts and feelings while problem solving in small-group and class discussion.

Soc, PS, IC, Grpg, Tchg (EC)

Hasegawa, Junichi. (1997, February). Concept formation of triangles and quadrilaterals in the second grade. *Educational Studies in Mathematics*, 32(2), 157-79.

The author observed that some second graders, when presented with the concept of an n-gon, gave persuading arguments containing a critical idea and the concept formation corresponding to a structure-preserved transformation in the diagram.

Geom, Lrng (EL)

Henningsen, Marjorie; Stein, Mary Kay. (1997, November). Mathematical tasks and student cognition: Classroom-based factors that support and inhibit high-level mathematical thinking and reasoning. *Journal for Research in Mathematics Education*, 28(5), 524-49.

This study examined how classroom-based factors can shape students' engagement with mathematical tasks that encourage high-level mathematical thinking and reasoning. Among the factors found to influence students were classroom norms, task conditions, teachers' instructional dispositions, and students' learning dispositions.

Soc, Att, TAtt, Lrng (ALL)

Hoffer, Thomas B. (1997, Summer). High school graduation requirements: Effects on dropping out and student achievement. *Teachers College Record*, 98(4), 584-607.

Data from a national survey of high school students were examined to determine the effects of increased mathematics requirements on the kinds of mathematics students studied, dropout rates, achievement test score gains, and the association of socioeconomic status with test scores and dropping out.

Ach, Soc, Ethn (HS)

Hoyles, Celia. (1997, February). The curricular shaping of students' approaches to proof. *For the Learning of Mathematics*, 17(1), 7-16.

This study presents the view that deductive mathematical proof offers the purest form of how to distinguish right from wrong. The author investigates students' understanding of proof and the proving process in mathematics.

Prf, Curr, Geom, Lrng (SE)

Hunt, Barbara. (1996-1997, Winter). The effect on mathematics achievement and attitude of homogeneous and heterogeneous grouping of gifted sixth grade students. *Journal of Secondary Gifted Education*, 8(2), 65-73.

Comparison of gifted, average ability, and low ability sixth-grade students (n=208), in either homogeneous or heterogeneous instructional settings found a positive effect for achievement in mathematics for the gifted students in the homogeneous grouping.

Gift, Grpg, Att (MS)

Jacobs, J. K.; and others. (1997). Japanese and American teachers' evaluation of mathematics lessons: A new technique for exploring beliefs. *The Journal of Mathematical Behavior*, 16(1), 7-24.

For the teachers in this study, beliefs were linked to practices which may help to tie teachers to their culturally preferred method of mathematics instruction.

TBlf, Tchg, CC, Ethn (EL, T)

Jardine, Richard. (1997, June). Active learning mathematics history. *Primus,* 7(2), 115-22.

This study describes student historical research and student classroom presentation of the results of that research. Feedback from the student surveys verified that active learning mathematics history can motivate students to learn mathematics.

Lrng, Matl, Curr (ALL)

Jetty, Michelle; Luczak, Vanessa. (1997, Spring). Mathematics laboratory: Evaluating student satisfaction levels. *Research and Teaching in Developmental Education,* 13(2), 90-94.

This study examined whether mathematics laboratory tutors at New York's Onondaga Community College have been able to adapt to the influx of developmental students over the past decade and indicates that, based on surveys of laboratory students, tutors have been able to provide quality assistance.

D/R, Curr (PS)

Jitendra, Asha K.; and others. (1997, Winter). Aligning the basal curriculum and assessment in elementary mathematics: The exploratory development of curriculum valid tests. *Diagnostique,* 22(2), 101-127.

A pilot test of 700 students in grades three, four, and five, investigated the reliability of curriculum-valid mathematics survey tests.

Curr, Assm (EL)

Jones, Graham A.; and others. (1997, February). A framework for assessing and nurturing young children's thinking in probability. *Educational Studies in Mathematics,* 32(2), 101-25.

This study presents a framework for assessing probabilistic thinking based on validated data obtained from (n=8) third-grade children who served as case studies. Levels of thinking appear to agree with the levels of cognitive functioning postulated by Neo-Piagetian theorists and provide a theoretical foundation for curriculum designers.

Prob, Curr, Assm (EL)

Kamii, Constance; Dominick, Ann. (1997). To teach or not to teach algorithms. *The Journal of Mathematical Behavior,* 16(1), 51-61.

Second-, third-, and fourth graders in 12 classes were individually interviewed to investigate the effects of teaching computational algorithms or encouraging to invent their own procedures. It was found that those who had not been taught any algorithms produced significantly more correct answers.

Arth, Tchg, Lrng (EL)

Kaminski, Eugene. (1997, September). Teacher education students' number sense: Initial explorations. *Mathematics Education Research Journal,* 9(2), 225-35.

Authors investigated number sense development of six primary teachers' pre-service teacher education students at the commencement of a semester unit in mathematics education. Students had at least a limited development of number sense.

NSns, Prsv, Tchg (EL, TE)

Kendall Tackett, Kathleen. (1997, September). Timing of academic difficulties for neglected and normal treated males and females. *Child Abuse & Neglect: The International Journal,* 21(9), 885-889.

Neglected or abused/neglected children (n=420) were compared with matched, normal-treated children on measures of school performance. Differences between the sexes in timing of academic difficulties was found for both mathematics and English.

Ach, D/R, Gend (K-12)

Kiefer, Markus; Dehaene, Stanislas. (1997). The time course of parietal activation in single-digit multiplication: Evidence from event-related potentials. *Mathematical Cognition,* 3(1), 1-30.

The results of this study suggested that simple multiplication problems may involve a short-lived activation in the left inferior parietal cortex, whereas complex problems may require longer processing which also involves the homologous right area.

M/D, Lrng, Arth (ALL)

Kleinberg, Sue; Menmuir, Joan. (1997, June). Enhancing curriculum policy in pre-five mathematics: A tool for audit, a framework for development. *International Journal of Early Years Education*, 5(2), 119-128.

This study used data from a study of "goodness of fit" between preschool mathematical curriculum policy and the content framework in Scottish guidelines. The article outlines a tool and process for eliciting use of the mathematical frameworks managers in planning curriculum, and gives examples of frameworks produced by the tool.

Curr, Tchg (K-12)

Knapp, Michael S. (1997, Summer). Between systemic reforms and the mathematics and science classroom: The dynamics of innovation, implementation, and professional learning. *Review of Educational Research*, 67(2), 227-266.

This review considers studies of large scale systemic reform initiatives aimed at mathematics and science education. The implementation and effects of reforms can be understood in theoretical terms applied to the study of innovation and change.

Revw, Curr (ALL)

Koechlin, Etienne; Dehaene, Stanislas; Mehler, Jacques. (1997). Numerical transformations in five-month-old human infants. *Mathematical Cognition*, 3(2), 89-104.

This study explored whether five-month-old infants (n=56) develop numerical or location based expectations by using a violation of expectation paradigm with possible and impossible events and reports that infants use a more abstract representation than object location, the numerical nature of which is discussed.

NSns, Patt (EC)

Koyama, Masataka. (1997, March). Research on the complementarity of intuition and logical thinking in the process of understanding mathematics: An examination of the two-axes process model by analyzing an elementary school mathematics class. *Hiroshima Journal of Mathematics Education*, 5, 21-33.

This study examined students' mental models of an abstract mathematical concept regarding intuition. The author observes how students think reflectively on their mental models in a whole-class discussion in terms of logical thinking.

Mtcg, Comm (EL)

Kranzler, John H.; Pajares, Frank. (1997, January). An exploratory factor analysis of the mathematics self efficacy scale revised (MSES R). *Measurement and Evaluation in Counseling and Development*, 29(4), 215-228.

An exploratory factor analysis of the mathematics self efficacy scale, based on data from (n=522) undergraduates from three different colleges, indicated that the scale is a multidimensional measure of mathematics self efficacy with reliable subscales.

Att, Rsch (PS)

Kupermintz, Haggai; Snow, Richard E. (Spring, 1997). Enhancing the validity and usefulness of large-scale educational assessments: III. NELS:88 Mathematics Achievement to 12th grade. *American Educational Research Journal*, 34(1), 124-150.

This study demonstrates the utility of a multidimensional representation of students' mathematics achievement. Findings support a basic distinction between mathematical reasoning and mathematical knowledge.

Ach, Rsch, Impl (HS)

Kyle, William C., Jr. (1997, August). The imperative to improve undergraduate education in science, mathematics, engineering, and technology. *Journal of Research in Science Teaching*, 34(6), 547-49.

Author discusses two reports: (1) the National Research Council's "From Analysis To Action: Undergraduate Education in Science, Mathematics, Engineering, and Technology"; and (2) the National Science Foundation's "Shaping the

Future: New Expectations for Undergraduate Education in Science, Mathematics, Engineering, and Technology."

Revw, Curr (PS)

Ladson-Billings, Gloria. (1997, December). It doesn't add up: African American students' mathematics achievement. *Journal for Research in Mathematics Education*, 28(6), 697-708.

This article discusses how, despite changes in mathematics education, African American students continue to perform poorly in school mathematics. Possible reasons for this include a lack of continuity between students' home language and the perceived "precision" of mathematics, and the possibility that the content of school mathematics is divorced from students' everyday experiences.

Ach, Ethn, Eqty, Curr, Soc, Revw (ALL)

Lambdin, Diana V.; Duffy, Thomas M.; Moore, Julie A. (1997). Using an interactive information system to expand preservice teachers' visions of effective mathematics teaching. *Journal of Technology and Teacher Education*, 5(2-3), 171-202.

This research investigated the use of an interactive videodisk information system to help preservice elementary-school teachers expand their visions of teaching, learning, and assessment in mathematics. Teachers and lessons in the videos served as models for the preservice teachers and offered a springboard for student reflection and discussion.

Prsv, Tech, TAtt, Tchg (TE, EL)

Lawson, Doris P. (1997, November). From caterpillar to butterfly: A mathematics teacher's struggle to grow professionally. *Teaching Children Mathematics*, 4(3), 140-43.

This article describes a mathematics teacher's experience and change from a traditional behaviorist dispenser of knowledge to a constructivist facilitator of meaning during professional development.

Insv, Curr, TBlf (SE, TE)

Lawson, Duncan. (1997, December). What can we expect from A-level mathematics students? *Teaching Mathematics and Its Applications*, 16(4), 151-56.

This article discusses results obtained by students with A-level mathematics on Coventry University's diagnostic test in October, 1997. This article compares these results with those of students who entered the university in 1991.

Ach (PS)

Leder, Gilah C.; Forgasz, Helen J. (1997, November). Single-sex classes in a coeducational high school: Highlighting parents' perspectives. *Mathematics Education Research Journal*, 9(3), 274-91.

This study evaluated a program of single-sex mathematics classes at one coeducational high school by focusing on parents' perceptions. Authors conclude that more parents supported the program than were opposed to it and support appeared to have waned over the three-year period of the study.

Gend, Soc, Grpg (HS)

Lee, Mi Ok C, Thompson, Ann. (1997). Guided instruction in LOGO programming and the development of cognitive monitoring strategies among college students. *Journal of Educational Computing Research*, 16(2), 25-144.

This research, using an approach to teaching Logo programming that directly guided the student in the use of cognitive monitoring skills and the transfer of those skills, led to increased comprehension monitoring on both near transfer and far transfer tasks.

Mtcg, PS, Comp (PS)

Lee, Valerie E.; and others. (1997, Summer). Course taking, equity, and mathematics learning: Testing the constrained curriculum hypothesis in U.S. secondary schools. *Educational Evaluation and Policy Analysis*, 19(2), 99-121.

How the organization of U.S. high school mathematics curriculum affects how much students learn was studied with data from 123 schools in the National Assessment of Educational Progress. Results indicate that students learn more in schools that offer a narrow curriculum of mostly academic courses.

Ach, Curr, Eqty, Lrng (HS)

LeFevre, Jo Anne; Liu, Jing. (1997). The role of experience in numerical skill: Multiplication performance in adults from Canada and China. *Mathematical Cognition*, 3(1), 31-62.

This study examined adults from China and Canada solving single-digit multiplication problems and reports that Chinese adults were faster and made fewer errors than Canadian adults, and Chinese adults made more errors that reflect verbal production processes.

CC, M/D, PS, Arth (PS)

Lehrer, Richard; Shumow, Lee. (1997). Aligning the construction zones of parents and teachers for mathematics reform. *Cognition and Instruction*, 15(1), 41-83.

Three studies found that parents endorsed many reform practices. However, in a comparison of word problem scaffolding, parents gave more direct forms of assistance than did teachers.

Soc, Tchg (K-12)

Leikin, Roza; Zaslavsky, Orit. (1997, May). Facilitating student interactions in mathematics in a cooperative learning setting. *Journal for Research in Mathematics Education*, 28(3), 331-54.

Authors investigated the effects of learning mathematics in a cooperative small-group setting on different types of student interactions in low-level ninth grade classes. Findings indicate an increase in students' activity, a shift toward on-task verbal interaction, and various opportunities for students to receive help.

Grpg, Clln (HS)

Lent, Robert W. Brown, Steven D. Gore, Paul A., Jr. (July, 1997). Discriminant and predictive validity of academic self-concept, academic self-efficacy, and mathematics-specific self-efficacy. *Journal of Counseling Psychology*, 44(3), 307-315.

This study examined whether global academic self-concept and academic self-efficacy beliefs that vary in domain specificity/globality represent distinct or common underlying dimensions. Results based on (n=205) university students revealed that each of the variables represented separate, though related, latent dimensions of self-perception.

Att, Blf, Lrng (PS)

Leron, Uri; Hazzan, Orit. (1997, March). The world according to Johnny: A coping perspective in mathematics education. *Educational Studies in Mathematics*, 32(3), 265-92.

This study analyzes students' productions, taking affective and social factors into account. This study uses the technique of virtual monologue to reproduce the student's voice in order to describe as vividly as possible what might be going on in the student's mind during such situations.

Aff, Soc, Lrnr (SE)

Lesh, Richard; Kelly, Anthony E. (1997, July). Teachers' evolving conceptions of one-to-one tutoring: A three-tiered teaching experiment. *Journal for Research in Mathematics Education*, 28(4), 398-430.

This report describes a three-tiered teaching experiment in which teachers were studied over a protracted period of time as they attempted to understand and improve their approaches to one-to-one tutoring. It documents the initial and revised strategies of the teachers.

Tchg, Tchr, Grpg, TKnw (TE)

Leung, Martin; and others. (1997, January). Learning from equations or words. *Instructional Science*, 25(1), 37-70.

This article discusses four experiments with high school students designed to study the cognitive load consequences of learning from equations and words.

Lrng, Alg, PS (HS)

Leung, Shukkwan S.; Silver, Edward A. (1997, May). The role of task format, mathematics knowledge, and creative thinking on the arithmetic problem posing of prospective elementary school teachers. *Mathematics Education Research Journal*, 9(1), 5-24.

This article describes an examination of arithmetical problem posing designed to examine the behaviors of (n=63) prospective elementary school teachers. Findings indicate the test effectively evaluates arithmetic problem posing.

Arth, PS, TKnw (T, EL)

Litchfield, Daniel C.; Goldenheim, David A. (1997, January). Euclid, Fibonacci, Sketchpad. *Mathematics Teacher*, 90(1), 8-12.

This study describes the solution to a geometric problem by two ninth-grade mathematicians using The Geometer's Sketchpad computer software program. The solution yielded two constructions, one a GLaD construction and the other using the Fibonacci sequence.

CAI, Geom, PS (HS)

Lopez, Frederick G.; and others. (1997, January). Role of social cognitive expectations in high school students' mathematics related interest and performance. *Journal of Counseling Psychology*, 44(1), 44-52.

This study tested path models of academic interest and performance that were derived from social cognitive theory. Results supported a model in which ability helps determine self efficacy.

Att, Soc, Aff, Lrng (HS)

Lord, Thomas; Holland, Melinda. (1997, February). Preservice secondary education majors and visual-spatial perception: An important cognitive aptitude in the teaching of science and mathematics. *Journal of Science Teacher Education*, 8(1), 43-53.

This study investigated the hypothesis that preservice teachers specializing in science and mathematics will score significantly higher on spatial-ability tests than other preservice teachers. Also it investigated gender-related differences in spatial ability.

Gend, Vis, Prsv (SE, T)

Lucangeli, Daniela; Cornoldi, Cesare. (1997). Mathematics and metacognition: What is the nature of the relationship? *Mathematical Cognition*, 3(2), 121-139.

Authors examined the success level in standardized mathematical testing and awareness regarding control processes during the test execution of third-grade (n=397) and fourth-grade (n=394) children and concluded that numerical and geometrical problem-solving abilities are most strongly related to metacognitive capabilities.

Mtcg, PS, Styl, Geom (EL)

Lynch, Diane. (1997, March-April). Creativity: A key to understanding. *Mathematics Teaching in the Middle School*, 2(5), 350-51.

This article describes the results of a classroom trial activity to encourage communication in mathematics. The activity revealed creativity and allowed the teacher to determine how well students understood the concept.

Comm, Assm (SE)

Ma, Xin. (1997, March-April). Reciprocal relationships between attitude toward mathematics and achievement in mathematics. *Journal of Educational Research*, 90(4), 221-229.

This study examined reciprocal relationships between attitude toward mathematics and mathematics achievement. Results indicated that reciprocal relationships existed, suggesting that the reciprocal nature between attitude and achievement can substantially modify their causal relationship.

Ach, Att, Ethn (SE)

Ma, Xin; Kishor, Nand. (1997, January). Assessing the relationship between attitude toward mathematics and achievement in mathematics: A meta-analysis. *Journal for Research in Mathematics Education*, 28(1), 26-47.

This study was designed to assess the magnitude of the relationship between attitude toward mathematics and achievement in mathematics. The study employed meta-analysis to integrate and summarize the findings from 113 primary studies.

Revw, Att, Ach (SE)

Maccini, Paula; Hughes, Charles A. (1997, Summer). Mathematics interventions for adolescents with learning disabilities. *Learning Disabilities Research and Practice*, 12(3), 168-176.

Based on a systematic search of literature published from 1988 to 1995, 20 mathematics interventions for secondary students with learning disabilities were identified and analyzed. Effective methods include teacher-directed instruction, instructional design curriculum variables, three-term contingency trials, strategy instruction, self-monitoring strategies, contextualized word problems, and cooperative homework teams.

LD, Tchg, Revw, Grpg (SE)

MacGregor, Mollie; Stacey, Kaye. (1997, June). Students' understanding of algebraic notation: 11-15. *Educational Studies in Mathematics*, 33(1), 1-19.

This study investigated the cognitive and linguistic demands of learning algebra and explored students' understanding of algebraic notation. Findings indicate specific origins of misinterpretation such as intuitive assumptions and pragmatic reasoning about a new notation, interference from new learning in mathematics, and the effects of misleading teaching materials.

Alg, Lrng, Mscn (SE)

Maher, Carolyn A.; Speiser, Robert. (1997). How far can you go with block towers? *The Journal of Mathematical Behavior,* 16(2), 125-132.

This study focused on the development of combinatorial reasoning of a 14-year-old child, who investigated binomial coefficients and combinations in relationship to the binomial expansion and the mapping of the binomial expansion to Pascal's triangle.

Matl, Alg, Lrng, Patt (MS)

Mandeville, Garrett K.; Liu, Qiduan. (1997, May). The effect of teacher certification and task level on mathematics achievement. *Teaching and Teacher Education*, 13(4), 397-407.

This study examined the interaction effect of teachers' mathematics preparation and the thinking level of mathematics problems on student performance. Results indicated that students performed better on higher-level thinking tasks when teachers had advanced certification in the subject.

TKnw, Ach, Prsv, Tchg (SE)

Mariotti, Maria Alessandra; Fischbein, Efraim. (1997, December). Defining in classroom activities. *Educational Studies in Mathematics*, 34(3), 219-48.

This study involved aspects of the defining process in a geometrical context using the theory of 'figural concepts'.

Geom, PS (MS)

Mathews, Susann M. (1997, September). The effect of using two variables when there are two unknowns in solving algebraic word problems. *Mathematics Education Research Journal*, 9(2), 122-35.

This experiment, in which Algebra I students (n=181) learned to translate word problems with two unknowns, found that students who had learned to solve equations with the new method scored higher than those students using the traditional method.

Alg, PS, Curr, Lrng (SE)

Mevarech, Zemira R. Kramarski, Bracha. (1997, Sum). IMPROVE: A multidimensional method for teaching mathematics in heterogeneous classrooms. *American Educational Research Journal*, 34(2), 365-394.

IMPROVE, a method for teaching mathematics using metacognitive activities, peer interaction, and feedback-corrective enrichment, was developed and tested in studies involving (n=247) and (n=265) seventh graders. Results of both studies showed that IMPROVE students significantly outperformed nontreatment controls.

Curr, Ach (MS)

Mevarech, Zemira R.; Kramarsky, Bracha. (1997, March). From verbal descriptions to graphic representations: Stability and change in students' alternative conceptions. *Educational Studies in Mathematics*, 32(3), 229-63.

This study investigates students' conceptions and misconceptions relating to the construction of graphs. Qualitative analysis of students' responses identified three main alternative conceptions.

Mscn, Rep, Lrng (SE)

Meyer, Debra K.; and others. (1997, May). Challenge in a mathematics classroom: Students' motivation and strategies in project based learning. *Elementary School Journal*, 97(5), 501-521.

Analyses of fifth- and sixth graders' challenge seeking during project-based mathematics instruction indicated two patterns: "challenge seekers," who self reported a tolerance for failure.

and learning goal orientation; and "challenge avoiders," who self reported a higher negative affect after failure, a more performance-focused goal orientation, and lower self-efficacy in math.

Att, Lrnr, PS (EL)

Mittelberg, David; Ari, Lilach Lev. (1997, November). Gender differences in mathematics among Jewish and Arab youth in Israel. *Mathematics Education Research Journal,* 9(3), 347-51.

This article discusses gender differences in mathematics among Jewish and Arab youth in Israel by presenting research done in four Jewish and two Israeli Arab coeducational schools. The factors influencing the degree to which high school students in the Jewish and Arab sectors anticipate a mathematically-based profession in the future were examined.

Gend, CC, Soc (HS)

Moloney, Kevin; Stacey, Kaye. (1997, May). Changes with age in students' conceptions of decimal notation. *Mathematics Education Research Journal,* 9(1), 25-38.

This study examined Australian students' conceptions of ordering decimals. Secondary students (n=50), studied over a 12-month period, showed little change in their misconceptions. Whole number misconceptions are important in earlier years but disappear with time. The fraction misconception persists however, being displayed by approximately 20% students.

Frac, Mscn, NSns, Tchg (SE)

Monk, David; Rice, Jennifer King. (1997, December). The distribution of mathematics and science teachers across and within secondary schools. *Educational Policy,* 11(4), 479-498.

Using 1987 Longitudinal Study of American Youth data, this study examined allocation of mathematics and science teachers' subject area preparation levels across and within a national sample of American secondary schools.

Tchr, TKnw (T, SE)

Monroe, Eula Ewing; Pendergrass, Michelle R. (1997, Fall). Effects of mathematical vocabulary instruction on fourth grade students. *Reading Improvement,* 34(3), 120-132.

This study compared effects of two models of mathematical vocabulary instruction, an integrated graphic organizer/discussion model and a definition-only model, on the mathematical vocabulary use of fourth-grade students.

Tchg, Lang (EL)

Morgan Fleming, Barbara; Doyle, Walter. (1997, July). Children's interpretations of curriculum events. *Teaching and Teacher Education,* 13(5), 499-511.

This study examined how urban fourth graders interpreted curriculum events, especially those involving mathematics, investigating everyday representations of mathematical concepts, subject matter learning, knowledge production processes, and event structured knowledge.

Blf, Ethn (EL)

Morita E; Inagaki K. (1997, June). Organizing whole-class discussion in mathematics lessons-Effects of presenting a problem with answer alternatives. *Japanese Journal of Educational Psychology,* 45(2), 129-139.

The present study examined differential effects of whole-class discussion beginning with a problem, with and without answer alternatives, on its developments and cognitive consequences in the case of adding fractions with different denominators. fourth- and fifth-graders (n=289) from six elementary schools were used as subjects.

Comm, Tchg, Clln, Frac (EL)

Morrison, Frederick J.; and others. (1997, March). Nature-nurture in the classroom: Entrance age, school readiness, and learning in children. *Developmental Psychology,* 33(2), 254-262.

This study assessed the reading and mathematics abilities of kindergartners and first graders in the fall and spring of the school year and found that younger first graders made as much progress over the year as older first graders and more than older kindergartners.

Lrng (EC)

Mukhopadhyay, Swapna. (1997, March). Storytelling as sense-making: Children's ideas about negative numbers. *Hiroshima Journal of Mathematics Education,* 5, 35-50.

The performance of children in different grades was examined as they attempted to solve simple equations involving addition and subtraction of integer numbers. The extended task involved creating a story that matched the equations.

Lrng, Arth, Nsns, IC (EL)

Mulligan, Joanne T.; Mitchelmore, Michael C. (1997, May). Young children's intuitive models of multiplication and division. *Journal for Research in Mathematics Education,* 28(3), 309-30.

The authors investigated the calculation strategies used by female students in grades two and three to solve word problems. Findings indicate that students used three main intuitive models: direct counting, repeated addition, and multiplicative operation.

PS, Knw, M/D, Gend (EC)

Mura, Roberta; Maurice, Louise. (1997, November). L'Infini, un ensemble de nombres? Enquete aupres de futurs enseignants et enseignantes [Infinity—a set of numbers? A study of preservice teachers]. *For the Learning of Mathematics,* 17(3), 28-35.

This study investigates the use of infinities and limits during the first 12 years of schooling while a secondary study presents ideas and comments on the observations that were made during the primary study.

NSns, Lrng, Calc (ALL)

Murtadha-Watts, Khaula; D'Ambrosio, Beatriz S. (1997, December). A convergence of transformative multicultural and mathematics instruction? Dilemmas of group deliberations for curriculum change. *Journal for Research in Mathematics Education,* 28(6), 767-82.

This article reports efforts to produce a socially-transformative multicultural mathematics curriculum for grades K-6. Described are the perplexity of issues related to the definition of multicultural and mathematics curricula for social transformation, the complexities of group deliberation, and the demands involved in the teacher-research process.

Ethn, Curr, Rsch (EL)

Naglieri, Jack A.; Gottling, Suzanne H. (1997, September-October). Mathematics instruction and pass cognitive processes: An intervention study. *Journal of Learning Disabilities,* 30(5), 513-520.

Instruction designed to facilitate planning was provided to (n=12) mathematics students with learning disabilities to determine if there would be differential effects on individual students. Teaching control and regulation of cognitive activity was beneficial for all students but was especially helpful for those with poor planning skills.

LD, Plan, Tchg (EL)

Naizer, Gilbert L. (1997, Winter). Validity and reliability issues of performance portfolio assessment. *Action in Teacher Education,* 18(4), 1-9.

This study evaluated the validity and reliability of performance portfolios in a preservice elementary mathematics/science methods class, assessing students' domain strategic and general learning strategic knowledge.

Assm, Prsv, TKnw (TE, EL)

Nakahara, Tadao. (1997, March). Study of the constructive approach in mathematical education (II): Types of constructive interactions and requirements for the realization of effective interactions. *Hiroshima Journal of Mathematics Education,* 5, 1-10.

This study aims to establish a theory for planning and practicing mathematics instruction that enables children to actively construct mathematical knowledge. Four types of constructive interactions are recognized on the basis of teaching practice.

Lrng, Knw, Tchg (EL)

Nemirovsky, Ricardo; Noble, Tracy. (1997, July). On mathematical visualization and the place where we live. *Educational Studies in Mathematics,* 33(2), 99-131.

This case study describes a high school student use of a computer-based tool, the Contour Analyzer, to create graphs of height versus distance and slope versus distance for a flat board positioned with different slants and orientations.

CAI, Vis, Geom, Matl, Alg (HS)

Nguyen-Xuan, A.; Nicaud, Jean-Francois; Gelis, Jean-Michel. (1997). Effect of feedback on learning to match algebraic rules to expressions with an intelligent learning environment. *Journal of Computers in Mathematics and Science Teaching*, 16(2-3), 291-321.

This article presents a comparative study of the effects of feedback on students who learned to solve algebraic factorization problems in an intelligent learning environment. The study concluded that when the same error comments were used in both experiments, similarities were observed in the learning paths of the respective student groups.

Alg, Comp (SE)

Nicol, Marsha P. (1997, February). How one physics teacher changed his algebraic thinking. *Mathematics Teacher*, 90(2), 86-89.

Following a week-long institute on using graphing calculators, a physics teacher became an advocate of calculator use and his algebraic thinking progressed as he realized the importance of functions.

TAtt, Insv, GCal, TKnw (T)

Noss, Richard; Healy, Lulu; Hoyles, Celia. (1997, July). The construction of mathematical meanings: Connecting the visual with the symbolic. *Educational Studies in Mathematics*, 33(2), 203-33.

This study explored the relationship between learners' actions, visualizations, and the means by which these are articulated. This article presents a case study of two students using Mathsticks, designed to help students construct mathematical meanings by forging links between visual and symbolic representations.

Rep, Vis, Lrng, Matl (SE)

Nozade, Giorgi; Romberg, Thomas A. (1997). Active readiness method of teaching mathematics. *The Journal of Mathematical Behavior*, 16(2), 133-144.

This article reports on the development of the Active Readiness Methods of Teaching mathematics in the Republic of Georgia. Preliminary data from classrooms where students have used experimental textbooks based on this approach have been very positive.

Matl, Curr (ALL)

Nunokawa, Kazuhiko. (1997). Data versus conjectures in mathematical problem solving. *Focus on Learning Problems in Mathematics*, 19(1), 1-19.

This study analyzes the problem-solving process and presents the dominance of the conjecture or theoretical aspect as a subtle relation between the data and the conjecture. The author argues that conjectures are not necessarily subordinate to the data but play active roles in mathematical problem solving.

Lrng, PS (ALL)

Nunokawa, Kazuhiko. (1997). Giving new sense to the existing elements: A characteristic of the solution accompanied by global restructuring. *The Journal of Mathematical Behavior*, 16(4), 365-378.

In the solving process accompanied by global restructuring, the solver paid attention to the extant element and tried to give them new senses. On the other hand, in the solving process not accompanied by it, the solver tried to change his structures in a straight way by introducing new elements that were not mentioned in the problem statement.

PS, Patt, Plan (K-12)

Onwuegbuzie, Anthony J.; Da Ros, Denise; Ryan, Joseph M. (1997). The components of statistics anxiety: A phenomenological study. *Focus on Learning Problems in Mathematics*, 19(4), 11-35.

This article presents a study aimed at using qualitative research paradigms to examine the nature and etiology of statistics anxiety among graduate students (n=21) from various non-statistical disciplines.

Anx, Rsch, Stat (PS)

Ostler, Elliott. (1997, September-October). The effect of learning mathematical reading strategies on secondary students' homework grades. *Clearing House*, 71(1), 37-40.

This study shows that it is necessary to spend time to teach students how to read their mathematics textbooks and that instruction related to skills and strategies for reading students' mathematics textbook aided students in their ability to complete homework assignments.

Lang, Matl, Lrng (HS)

Pajares, Frank; Miller, M. David. (1997, Spring). Mathematics self efficacy and mathematical problem solving: Implications of using different forms of assessment. *Journal of Experimental Education,* 65(3), 213-228.

The mathematics self efficacy and problem solving performance of (n=327) middle school students were assessed with multiple choice and open-ended methods. No differences in self efficacy resulted from the different forms of assessment, although those who took the multiple choice test had higher scores and better calibration of ability.

Assm, Att, PS (MS)

Parker, Diane L.; Picard, Anthony J. (1997, March). Portraits of Susie: Matching curriculum, instruction, and assessment. *Teaching Children Mathematics,* 3(7), 376-82.

This study describes a 7-year-old whose classroom mathematical performance embodies much of what is important according to NCTM Standards. Authors conclude that changes in curriculum and classroom instruction require changes in assessment that recognize complex behavior.

Tchg, Assm, PS, Curr, Lrng (EL)

Pehkonen, Erkki. (1997, June). Learning results from the viewpoint of equity: Boys, girls and mathematics. *Teaching Mathematics and Its Applications,* 16(2), 58-63.

This study explores why girls successful in mathematics choose advanced courses in upper secondary school less than boys. Findings indicate that in the case of word problems and calculation without calculators, boys are significantly better than girls. This article reports that the boys showed stronger self-confidence than the girls.

Gend, Att, Eqty, Ach (ALL)

Peled, Irit. (1997, July-August). Forms of passiveness encoding and risk-taking of poor math learners. *International Journal of Mathematical Education in Science and Technology,* 28(4), 581-89.

This study explored forms of passive behavior in unsuccessful mathematics students (n=20). Two forms of passive behavior are discussed, one concerning encoding new knowledge and the other involving risk-taking in unmastered tasks.

Anx, Lrnr, Ach (EL)

Peled, Irit; Zaslavsky, Orit. (1997). Counter-examples that (only) prove and counter-examples that (also) explain. *Focus on Learning Problems in Mathematics,* 19(3), 49-61.

This article presents a study examining whether different types of counterexamples exist and the extent to which counterexamples generated by mathematics teachers and pre-service teachers for a hypothetical audience of students have an explanatory nature.

Tchr, Tchg (T, TE)

Peressini, Dominic. (1997, September). Parental involvement in the reform of mathematics education. *Mathematics Teacher,* 90(6), 421-27.

This research attempts to shed some light on the relationship between parents and mathematics teachers by examining the role that parents play in mathematics education reform at eight high schools and one laboratory school.

Curr, Soc, PS, Tchg (HS)

Perlmutter, Jane; Bloom, Lisa; Rose, Terry; Rogers, Anita. (1997, Fall-Winter). Who uses math? Primary children's perceptions of the uses of mathematics. *Journal of Research in Childhood Education,* 12(1), 58-70.

This study sought to ascertain children's perceptions of the value and usefulness of mathematics. Findings indicated that children at the kindergarten through third-grade levels are positive about mathematics and their abilities to do mathematics.

Att (EL)

Phillips, Meredith. (Winter, 1997). What makes schools effective? A comparison of the relationships of communitarian climate and academic climate to mathematics achievement and attendance during middle school. *American Educational Research Journal*, 34(4), 633-662.

The article used hierarchical modeling to compare the merits of two theories of school effectiveness. Analyses of longitudinal data of three cohorts of students indicated that communal organization was not related to mathematical achievement or attendance. Academic press, on the other hand, was positively related to both mathematics achievement and attendance.

Ach, Lrng (MS)

Piez, Cynthia M.; Voxman, Mary H. (1997, February). Multiple representations: Using different perspectives to form a clearer picture. *Mathematics Teacher*, 90(2), 164-66.

This article presents a project that explored student choice of solution method for quadratic inequalities. Students were first instructed in the use of the case, critical-number, and graphical methods using the graphing calculator. The majority of students chose graphical methods of solution.

PS, GCal, Alg, Rep (HS, PS)

Pirie, Susan E.B.; Martin, Lyndon. (1997, November). The equation, the whole equation, and nothing but the equation! One approach to the teaching of linear equations. *Educational Studies in Mathematics*, 34(2), 159-81.

This article presents the results of a case study which looked at the mathematics classroom of one teacher trying to teach mathematics with meaning to pupils of lower ability at the secondary level.

Tchg, Rep, Alg (T, SE)

Power, Richard; Martello, Maria Felicita Dal. (1997). From 834 to eighty thirty four: The reading of Arabic numerals by seven-year-old children. *Mathematical Cognition*, 3(1), 63-85.

Authors observed several regular error patterns when a group of seven-year-old Italian children transcoded Arabic numerals to verbal numerals. Included is an explanation of the development of transcoding ability by an asemantic model using production rules.

Arth, Mscn (EL)

Prawat, Richard S.; Jennings, Nancy. (1997, January). Students as context in mathematics reform: The story of two upper elementary teachers. *Elementary School Journal*, 97(3), 251-270.

This case study describes two experienced teachers' attitudes and actions during implementation of a new mathematics curriculum in California and focuses on their attentiveness to learners' needs.

TAtt, Curr, Tchg (EL, T)

Quinn, Robert J.; Wilson, Mary M. (1997, September-October). Writing in the mathematics classroom: Teacher beliefs and practices. *Clearing House*, 71(1), 14-20.

This research investigated current beliefs and practices of elementary and secondary teachers regarding the use of writing to teach mathematics. Teachers indicated strong beliefs in the benefits of using writing to teach mathematics, yet actually used writing activities less than once a week.

Writ, TAtt, Tchg (K-12)

Raghavan, Kalyani; Sartoris, Mary L.; Glaser, Robert. (1997). The impact of model-centered instruction on student learning: The area and volume units. *Journal of Computers in Mathematics and Science Teaching*, 16(2-3), 363-404.

This study examined the impact of the first two units of a sixth-grade curriculum module implemented in a public school during the 1993-94 school year. This article describes the underlying rationale and content of the entire nine-unit module and focuses on area and volume.

Curr, Geom, Lrng, Meas (MS)

Raymond, Anne M. (1997). The use of concept mapping in qualitative research: A multiple case study in mathematics education. *Focus on Learning Problems in Mathematics*, 19(3), 1-28.

The research values of examining thoughts through visual representations is demonstrated through the context of a qualitative study of relationships between mathematics beliefs and practice in which concept mapping played key and multiple roles.

Att, Rsch, Vis (ALL)

Raymond, Anne M. (1997, November). Inconsistency between a beginning elementary school teacher's mathematics beliefs and teaching practice. *Journal for Research in Mathematics Education*, 28(5), 550-76.

This study investigated the relationship between a beginning elementary school teacher's beliefs and mathematics teaching practices. The teacher's practice was more closely related to beliefs about mathematics content rather than beliefs about mathematics pedagogy. Beliefs about mathematics content were highly influenced by personal experiences as a student.

TBlf, Tchg, Insv, Tchr (T, EL)

Rennie, Leonie J.; Parker, Lesley H. (1997, August). Teachers' perceptions of the implementation of single sex classes in coeducational schools. *Australian Journal of Education*, 41(2), 119-133.

This paper reports research on a pilot project in Western Australia in which single-sex science and mathematics classes were begun in 10 coeducational secondary schools.

Gend, TAtt, Tchg (SE, T)

Rennie, Leonie; Parker, Lesley H. (1997, November). Students' and teachers' perceptions of single-sex and mixed-sex mathematics classes. *Mathematics Education Research Journal*, 9(3), 257-73.

This study examined students' perceptions of learning settings in single-sex and mixed-sex mathematics classes and teachers' responses to those different classroom contexts. Single-sex classrooms provided a more supportive environment for girls but a significantly less supportive environment for boys.

Gend, Att, TAtt, Grpg (ALL, T)

Ricco, Robert B. (1997, September). The development of proof construction in middle childhood. *Journal of Experimental Child Psychology*, 66(3), 297-310.

This research explored the construction of mathematical proofs through a hidden figure task and a variant of the Mastermind game with children 7-12 years old. Older children were better able to distinguish necessary moves and to recognize sufficient evidence.

Prf, PS (EL)

Ridgway, Carolyn; Healy, Christopher. (1997, December). Evaluation of empowerment in a high school geometry class. *Mathematics Teacher*, 90(9), 738-41.

This article presents results from two skills surveys of Build a Book (BAB) classes, in which students learn geometry by writing and editing their own textbook. Students who had BAB classes in prior years could identify important areas of learning in addition to geometry.

Geom, Matl (HS)

Robinson, Nancy M. and others. (Fall, 1997). Developmental changes in mathematically precocious young children: Longitudinal and gender effects. *Gifted Child Quarterly*, 41(4), 145-158.

A two-year study randomly assigned kindergarten through second-grade children with advanced mathematical skills (n=276) to two groups, an intervention group reflecting a constructivist approach or a control. Boys gained more than girls on quantitative and visual-spatial measures in the control, whereas the intervention group made greater gains in quantitative measures.

Gift, Tchg, Vis (EC)

Ross, John A.; McKeiver, Sharon; Hogaboam Gray, Anne. (1997, Summer). Fluctuations in teacher efficacy during implementation of destreaming. *Canadian Journal of Education*, 22(3), 283-296.

Four ninth-grade mathematics teachers in Canada were studied over one year as they implemented destreaming (detracking), which was an externally-induced reform in their school system. Implementation of the destreaming had an immediate negative effect on teacher expectations of their own efficacy, but their beliefs rebounded over the year.

Tatt, Curr, Ethn (HS, TE)

Rustagi, Narendra K. (1997, November-December). A study of the retention of basic quantitative skills. *Journal of Education for Business*, 73(2), 72-76.

Testing of junior and senior business students on algebra, calculus, and statistics problems revealed they retained little of what was covered in basic quantitative courses. Emphasis on student evaluation of teachers may create incentives for instructors to avoid challenging students in these courses.

Alg, Calc, Ach, Assm, Stat (HS)

Ruthven, Kenneth; Chaplin, Di. (1997). The calculator as a cognitive tool: Upper-primary pupils tackling a realistic number problem. *International Journal of Computers for Mathematical Learning,* 2, 93-124.

This study examined the arithmetic calculator as a cognitive tool to support the amplification or reorganization of systems of thought.

Cltr, PS, Arth, NSns (EL)

Ruthven, Kenneth; Rousham, Laurie; Chaplin, Di. (1997). The long-term influence of a 'Calculator-Aware' number curriculum on pupils' mathematical attainments and attitudes in the primary phase. *Research Papers in Education,* 12(3), 249-82.

This study examines the long-term influence of the Calculator-Aware approach to numbers on the mathematical attainments and attitudes of pupils in the primary phase. The Calculator-Aware approach had no long-term influence on outcomes.

Cltr, NSns, Att (EL)

Ryan, Allison M.; Pintrich, Paul R. (1997, June). "Should I ask for help?" The role of motivation and attitudes in adolescents' help seeking in math class. *Journal of Educational Psychology,* 89(2), 329-341.

Motivational influences on help-seeking behavior in mathematics were studied with (n=203) seventh- and eighth graders. Perceived benefits and threats were important influences on avoidance of help-seeking behavior, but only benefits predicted adaptive help seeking.

Att (MS)

Saminy, Keiko K.; Liu, Jun. (1997). A comparative study of selected United States and Japanese first-grade mathematics textbooks. *Focus on Learning Problems in Mathematics,* 19(2), 1-13.

An analysis of selected first-grade mathematics textbooks used in Japanese and American schools focused on size and volume, repetition, length of explanations, mathematics content, gender issues, and the relevance of the pictures to the mathematics content.

Matl, CC (EL)

Sawada, Daiyo. (1997, September). NCTM's standards in Japanese elementary schools. *Teaching Children Mathematics,* 4(1), 20-23.

Five classroom situations in Japanese elementary schools are described and interpreted from the perspective of the first four standards in the National Council of Teachers of Mathematics' Curriculum and Evaluation Standards.

Curr, Ethn, PS, Soc (EL)

Schmidt, Sylvine; Bednarz, Nadine. (1997, February). Raisonnements arithmetiques et algebriques dans un contexte de Resolution de problemes: Difficultes rencontrees par les futurs enseignants [Arithmetic and algebraic reasoning in a problem solving context: Difficulties encountered by preservice teachers]. *Educational Studies in Mathematics,* 32(2), 127-55.

This article discusses the difficulties observed in the transition from teaching arithmetic to teaching algebra. Future teachers (n=164) were questioned regarding to what extent they were able to shift back and forth between teaching methods within the context of problem solving.

Alg, Tchg, Arth, TKnw, PS, Prsv (PS)

Schmidt, William H.; and others. (1997). A splintered vision: An investigation of U.S. science and mathematics education. Executive summary. *Wisconsin Teacher of Mathematics,* 48(2), 4-9.

This study attempted to document and characterize the state of U.S. mathematics and science curricula, textbooks, and teaching practices and place them in a cross-national context.

Curr, CC, Assm, Tchg (ALL)

Schuck, Sandra. (1997, July). Using a research simulation to challenge prospective teachers' beliefs about mathematics. *Teaching and Teacher Education,* 13(5), 529-539.

This study used a research simulation that had prospective elementary teachers role play as researchers and respondents. The simulation encouraged beliefs to become explicit and promoted opportunity for reflection about the implication of those beliefs for prospective teachers.

TBlf, Prsv (TE, EL)

Shaffer, David Williamson. (1997). Learning mathematics through design: The anatomy of Escher's world. *The Journal of Mathematical Behavior,* 16(2), 95-112.

This study explored one example of open learning environment created by combining mathematics and design activities in a "mathematics studio." Results show that expressive activities are a powerful context for learning and students are able to think about mathematical ideas in an expressive way.

Vis, IC, Blf (SE)

Shalev, R.S.; Manor, O.; Gross Tsur, V. (1997). Neuropsychological aspects of developmental dyscalculia. *Mathematical Cognition,* 3(2), 105-120.

Classification of arithmetic disorders is predicated on neuropsychological features and associated learning disabilities. Authors assess the compatibility of these classifications on a non-referred, population based cohort of children (n=139) with developmental dsycalculia.

D/R, Arth (K-12)

Shaw, Nomiki; Jean, Brian; Peck, Roger. (1997). A statistical analysis on the effectiveness of using a computer algebra system in a developmental algebra course. *The Journal of Mathematical Behavior,* 16(2), 175-180.

This study indicates that a computer algebra system is a very effective teaching tool for the developmental mathematics program and that students who took the traditional Intermediate Algebra course did not do as well in subsequent courses as students who took the technology-based course.

Comp, Alg (PS)

Shermis, Mark D. Chang, Shu-Hui. (June, 1997). The use of Item Response Theory (IRT) to investigate the hierarchical nature of a college mathematics curriculum. *Educational & Psychological Measurement,* 57(3), 450-458.

The degree to which an undergraduate mathematics curriculum matched the item difficulty levels of representative mathematics problems based on that sequence was studied with 62 items and (n=423) undergraduates and (n=937) high school seniors. Results suggest congruence between curriculum sequence and item difficulty levels.

Curr, Rsch, Assm (HS, PS)

Shute, Rosalyn; Miksad, John. (1997). Computer assisted instruction and cognitive development in preschoolers. *Child Study Journal,* 27(3), 237-253.

This study compared the use of microcomputers, providing either substantial or minimal scaffolding, to traditional resources on preschoolers' cognitive development over eight weeks. The researchers found that computer assisted instruction software increased verbal and language skills, but not mathematics skills, and only as a function of substantial scaffolding.

Comp, Curr (EC)

Sierpinska, Anna. (1997, June). Formats of interaction and model readers. *For the Learning of Mathematics,* 17(2), 3-12.

This article provides details of a study of mathematics learning that applies Bruner's concept of format of interaction which is employed in language acquisition theory and in understanding mathematical augmentation.

Lrng, ClIn, Alg, Curr (PS)

Signer, Barbara; Beasley, T. Mark; Bauer, Elizabeth. (1997). Interaction of ethnicity, mathematics achievement level, socioeconomic status, and gender among high school students' mathematics self concepts. *Journal of Education for Students Placed at Risk,* 2(4), 377-393.

This study examined the influence of ethnic background, socioeconomic status, and gender on mathematical ability and confidence in urban high school students. Interviews with 100 students revealed African-American youth do have academic self confidence, males sought more mathematics education than females, and that minority youth are not easily discouraged by low achievement.

Ethn, Gend, Att, Ach, Soc (HS)

Simmt, Elaine. (1997). Graphing calculators in high school mathematics. *Journal of Computers in Mathematics and Science Teaching,* 16(2-3), 269-89.

This study examined how some teachers used graphing calculators in their instruction of mathematics, and how their views of mathematics were manifested in the ways in which they chose to use this technology.

GCal, TAtt, Tech, Tchr (T)

Simonsen, Linda M.; Dick, Thomas P. (1997). Teachers' perceptions of the impact of graphing calculators in the mathematics classroom. *Journal of Computers in Mathematics and Science Teaching,* 16(2-3), 239-68.

This study compiled teachers' impressions of the barriers and/or incentives associated with the use of graphing calculators on classroom dynamics, curriculum and evaluation, training, support, and overall attitude. Teachers' perceptions of the advantages appeared to be instructionally related whereas perceptions of the disadvantages appeared to be primarily logistical in nature.

TAtt, GCal, Tchr, Tech (T)

Skrobarcek, Sharon A.; and others. (1997, May). Collaboration for instructional improvement: Analyzing the academic impact of a block scheduling plan. *NASSP Bulletin,* 81(589), 104-111.

While the two-hour Algebra I block had a higher failure rate than the traditional 50-minute algebra class, the block classes were comprised of students who have traditionally struggled in mathematics.

Curr (HS)

Slate, John R. (1997). Achievement test score differences for students with specific learning disabilities: A replication. *B.C. Journal of Special Education,* 21(1), 16-30.

Differences between and interrelationships among reading and mathematics achievement test scores for 269 students with learning disabilities were investigated to determine whether previous findings were replicable.

Ach, LD, Rsch (K-12)

Sleeter, Christine E. (1997, December). Mathematics, multicultural education, and professional development. *Journal for Research in Mathematics Education,* 28(6), 680-96.

This review of literature connects multicultural education with mathematics and analyzes how teachers view multicultural education and the impact of multicultural education staff development on mathematics teaching.

Soc, TBlf, Revw, Insv, Tchg (TE)

Smith, D. N. (1997, September). Independent mathematical modeling. *Teaching Mathematics and Its Applications,* 16(3), 101-06.

Author argues that a major difficulty in learning how to do mathematical modeling is in the first independent run through the modeling cycle. This case study of mathematical modeling presents conclusions in three sections: the choice of task, the presentation of the task, and tutor intervention and support.

Rep, Lrng, Revw (EL)

Smith, Erick; Haarer, Shawn; Confrey, Jere. (1997, September). Seeking diversity in mathematics education: Mathematical modeling in the practice of biologists and mathematicians. *Science and Education,* 6(5), 441-72.

This investigated how applied mathematicians and biologists collaborate in developing dynamic population models.

IC, Rep (PS)

Sophian, Catherine;Chang, Chuan; Garyantes, Danielle. (September, 1997). When three is less than two: Early developments in children's understanding of fractional quantities. *Developmental Psychology,* 33(5), 731-744.

Four experiments examined young children's understanding of the inverse relation between the number of parts into which a quantity is to be divided and the size of each part.

Frac, Lrng, Revw (EL)

Sophian, Catherine; Wood, Amy—double. (June, 1997). Proportional reasoning in young children: The parts and the whole of it. *Journal of Educational Psychology*, 89, 309-317.

This research found developmental changes in children's preferences for part-part versus part-whole relations. However, there was no evidence to suggest that part-part reasoning preceded part-whole reasoning developmentally. Instead, seven-year-olds reliably identified part-whole but not part-part matches, and younger children did not perform above chance on either type of match.

Frac, Lrng (EC)

Sowell, Evelyn; Zambo, Ron. (1997, Summer). Alignment between standards and practices in mathematics education: Experiences in Arizona. *Journal of Curriculum and Supervision*, 12(4), 344-345.

A recent survey questioned whether mathematics teachers in Arizona view mathematics content as dynamic or process oriented. Less than half used state curriculum guidelines, and few reported knowledge of NCTM emphases on mathematical processes related to problem solving or reasoning.

TBlf, TKnw, Tchg (TE)

Stacey, Kaye; MacGregor, Mollie. (1997, February). Ideas about symbolism that students bring to algebra. *Mathematics Teacher*, 90(2), 110-13.

Authors discusses the implications of a research study of more than 2000 11- to 15-year-old students that explored why students interpret algebra in particular ways. They recommend strategies that can help teachers deal with prior knowledge that students may bring to their study of algebra.

Alg, Soc, Mscn (SE)

Steiner, Gerhard F.; Stoecklin, Markus. (1997, September). Fraction calculation a didactic approach to constructing mathematical networks. *Learning and Instruction*, 7(3), 211-233.

Thirty-eight sixth graders were trained in fraction calculation through progressive transformation dialectics (PT) whereas a control group of 38 was taught through a traditional mathematics education framework. The PT group, encouraged to form network type knowledge representations, performed better on problems that required more than mere algorithmic calculations.

Tchg, Frac, Knw (MS)

Stevens, Carol Ann; Zaharias, Jane Ann. (1997). Problem-solution relationship instruction: A method for enhancing students' comprehension of word problems. *Focus on Learning Problems in Mathematics*, 19(2), 14-42.

This article describes a study which concluded that in order to restructure the mathematics curriculum, modification of existing teaching practices is required. Authors recommend that practices be modified to enable students to construct effective knowledge bases and become active learners.

Curr, PS, TKnw, Prsv (EL, TE)

Stick, Marvin E. (1997, May). Calculus reform and graphing calculators: A university view. *Mathematics Teacher*, 90(5), 356-60,63.

This article describes the results of a teacher's exploration of the effects of using graphing calculators in calculus instruction in sections other than those that are experimental. This study included two experimental and two traditional sections of Calculus I and II participated in the study.

Calc, GCal, Matl, Tchg (PS)

Streitmatter, Janice. (1997, September). An exploratory study of risk taking and attitudes in a girls only middle school math class. *Elementary School Journal*, 98(1), 15-26.

This study of girls' attitudes, toward themselves and their classmates, and girls' behavior in a girls-only mathematics classroom found girls were more likely to ask and answer questions in the mathematics classroom than in coeducational classes, and that the girls-only setting enhanced their ability to learn. The girls-only environment was overwhelmingly preferred.

Gend, Att, Soc (MS)

Suggate, Jennifer; Aubrey, Carol; Pettitt, Deirdre. (1997). The number knowledge of four to five year olds at school entry and at the end of their first year. *European Early Childhood Education Research Journal*, 5(2), 85-101.

This study examined the change in number knowledge and number strategies from school entry to year end among kindergartners. Many children displayed considerable numerical competence at school entry, and most displayed marked improvement over the year, whereas a small minority made very limited progress.

NSns, Lrng (EC)

Swafford, Jane O.; and others. (1997, July). Increased knowledge in geometry and instructional practice. *Journal for Research in Mathematics Education,* 28(4), 467-83.

This study examined the effects on instruction of an intervention program designed to enhance teachers' knowledge of geometry and their knowledge of research on student cognition in geometry. Findings indicate significant gains in content knowledge and in van Hiele level, and marked changes in what was taught, how it was taught, and the characteristics teachers displayed.

Tchg, TKnw, Geom (TE)

Swann, Joanna; Brown, Sally. (1997, March). The implementation of a national curriculum and teachers' classroom thinking. *Research Papers in Education: Policy and Practice,* 12(1), 91-114.

This study examined the impact of Scotland's national curriculum for students aged 5-14 on teachers' constructs of their teaching, assumptions about students' learning, and interpretations of and accommodations for student differences.

Curr, TAtt (EL, T)

Tarr, James E.; Jones, Graham A. (1997, May). A framework for assessing middle school students' thinking in conditional probability and independence. *Mathematics Education Research Journal,* 9(1), 39-59.

This article discusses a framework for assessing middle school students' thinking in conditional probability and independence. Students (n=15) from grades 4-8 were interviewed. Profiles revealed that levels of probabilistic thinking were stable across the two constructs.

PS, Prob, Assm (EL, MS)

Tate, William F. (1997, December). Race-ethnicity, SES, gender, and language proficiency trends in mathematics achievement: An update. *Journal for Research in Mathematics Education,* 28(6), 652-79.

This article reviews literature on mathematics achievement trends and discusses relevant population trends. Important findings include the improvement of all demographic groups in basic mathematics skills over the last 15 years.

Ach, Revw, Soc (ALL)

Taverner, Sally. (1997). Modular courses-A drip feed approach to teaching and learning? *Teaching Mathematics and Its Applications,* 16(4), 196-199.

This article reviews the types of learning activities and the frequency of their use by using data gathered as part of the A-Level Information System and concludes that most modular courses were found to be taught in more didactic fashion than linearly assessed courses.

Tchg, Assm (K-12)

Taverner, Sally; and others. (1997, March). English and mathematics teachers' attitudes to integration. *British Journal of Special Education,* 24(1), 39-43.

An attitude questionnaire completed by (n=102) British secondary teachers of English and mathematics concerning the integration of students with special education needs in regular classrooms found no significant differences between the two groups.

TAtt, Ethn, LD (TE)

Taylor, Janet A. (1997, February). Factorial validity of scores on the Aiken Attitude to Mathematics Scales for adult pretertiary students. *Educational and Psychological Measurement,* 57(1), 125-130.

The Aiken Attitude to Mathematics Scale (L. Aiken, 1974, 1979) was administered to (n=430) adult students in a tertiary preparation program and the factorial validity of the scale was investigated through exploratory factor analysis.

Att, Rsch (PS)

Taylor, Jill; Cox, Brian D. (1997). Microgenetic analysis of group-based solution of complex two-step mathematical word problems by fourth graders. *Journal of the Learning Sciences*, 6(2), 183-226.

Socially-assisted group learning was evaluated in terms of its effectiveness in promoting fourth-grade students' solution of complex two-step word problems. Students in the socially-assisted learning condition used labeled representations in problem solving more effectively.

PS, Grpg, Soc (EL)

Tharp, Marcia L.; Fitzsimmons, James A.; Ayers, Robin L. Brown. (1997). Negotiating a technological shift: Teacher perception of the implementation of graphing calculators. *Journal of Computers in Mathematics and Science Teaching*, 16(4), 551-75.

This article discusses the results of research which examined the perceptions of teachers as they initially engaged in instruction using graphing calculators. Participant views changed significantly overall in favor of viewing the graphing calculator as a thinking tool to enhance conceptual understanding and to expand exploration of topics.

Gcal, TAtt, TBlf (T)

Tooke, D. James. (1997, September-October). Middle school math teachers: What do they need from preservice programs? *Clearing House*, 71(1), 51-52.

This study concludes that teachers at the middle school level need to be better prepared in classroom management. Specifically, if preservice middle school math teachers were given training for managing classes at that particular level, their mathematics knowledge would be more fully and effectively communicated to their students.

Tchg, TKnw, Prsv (MS, TE)

Toomey, Ron; O'Donovan, Richard. (1997, September). Student voices about senior secondary mathematics: An investigation of Victorian senior secondary students' decisions about studying mathematics. *Mathematics Education Research Journal*, 9(2), 191-204.

This article presents case studies which indicating that the process of choosing subjects for the final years of schooling is part of the larger psycho-sociological process of identity formation for young adults.

Blf, Soc (SE)

Towse, John N.; Saxton, Matthew. (1997, September). Linguistic influences on children's number concepts: Methodological and theoretical considerations. *Journal of Experimental Child Psychology*, 66(3), 362-375.

This study examined role of linguistic demarcation of numerals on cognitive representations of numbers with Caucasian children, 5-7 years old. Results suggest that the task reflects children's interpretations and misinterpretations of task demands.

Lrng, Lang, NSns (EL)

Travis, Betty; Lennon, Elizabeth. (1997). Spatial skills and computer-enhanced instruction in calculus. *Journal of Computers in Mathematics and Science Teaching*, 16(4), 467-75.

A pilot program studying the use of computer software to enhance spatial skills presumed to be related to success in calculus found that the combined effects of the computer, drawing and drafting, and gender variables explained 31% of the variance in test scores.

Vis, CAI, Calc, Curr (HS)

Twale, Darla J.; Shannon, David M.; Moore, Matthew S. (1997, Fall). NGTA and IGTA training and experience: Comparisons between self ratings and undergraduate student evaluations. *Innovative Higher Education*, 22(1), 61-77.

A study compared self ratings and undergraduate student ratings of graduate teaching assistants (GTAs) on nine factors of teaching effectiveness, examining how mathematics and science GTAs who speak English as their native language differ from their international counterparts. Overall, self ratings were consistently higher than student ratings.

Lang, Ethn, Tchr (PS, T)

Ubuz, Behiye; Ersoy, Yasar. (1997). The effect of problem-solving method with handout material on achievement in solving max-min word problems. *The Journal of Mathematical Behavior*, 16(1), 75-85.

The results of the statistical analysis in this study show that a problem-solving method using handout material can significantly help students understand and learn word problems.

PS, Matl (PS)

Valverde, Gilbert A.; Schmidt, William H. (1997-1998). Refocusing U.S. math and science education. *Issues in Science and Technology*, 14(2), 60-66.

The Third International Mathematics and Science Study (TIMSS) compared mathematics and science scores across 41 countries. American students performed well in science and mathematics in the fourth grade but fell behind their international peers by the eighth grade.

Curr, CC, Ach, Rsch, Matl, Revw (ALL)

VanLeuvan, Patricia; Wang, Margaret C. (1997, January-February). An analysis of students' self monitoring in first- and second-grade classrooms. *Journal of Educational Research*, 90(3), 132-143.

This study examined (n=56) elementary students' verbalizations to identify instances of self instruction and self monitoring during reading and mathematics. Results indicated that half of the verbalizations were self instructive, and one quarter of those involved self monitoring.

Mtcg, Lrng (EL)

Varelas, Maria; Becker, Joe. (1997). Children's developing understanding of place value: Semiotic aspects. *Cognition and Instruction*, 15(2), 265-286.

This study explored whether a system between written place value system and base-ten manipulatives helped children understand place value and found evidence that the intermediate system helped children differentiate between face values and complete values of digits in multidigit place value number representations.

NSns, Manp, PlcV, Rep (EL)

Verschaffel, L.; De Corte, E.; Borghart, I. (1997, December). Pre-service teachers' conceptions and beliefs about the role of real world knowledge in mathematical modeling of school word problems. *Learning and Instruction*, 7(4), 339-359.

Fourteen word problems were administered to 332 Belgian preservice elementary school teachers who also saw answers given by four students. Results revealed a strong tendency to exclude real-world knowledge from spontaneous solutions and appreciations of student supplied answers.

TKnw, PS, Prsv, Ethn (EL, T)

Verschaffel, Lieven; De Corte, Erik. (1997, November). Teaching realistic mathematical modeling in the elementary school: A teaching experiment with fifth graders. *Journal for Research in Mathematics Education*, 28(5), 577-601.

A teaching experiment was carried out to test the hypothesis that it is feasible to develop a disposition toward more realistic mathematical modeling in pupils. The learning and transfer effects of an experimental class of 10- and 11-year-old students compared to the results of two control groups support this hypothesis.

Rep, Tchg (MS)

Vye, Nancy J.; Goldman, Susan R.; Voss, James F.; Hmelo, Cindy; Williams, Susan; Cognition and Technology Group at Vanderbilt University. (1997). Complex mathematical problem solving by individuals and dyads. *Cognition and Instruction*, 15(4), 435-484.

This paper describes two studies of mathematical problem solving using an episode from "The Adventures of Jasper Woodbury," a set of curriculum materials that afford complex problem solving opportunities.

Grpg, PS, Styl, Matl (ALL)

Waxman, Hersholt C.; and others. (1997, May). Motivation and learning environment differences between resilient and nonresilient Latino middle school students. *Hispanic Journal of Behavioral Sciences*, 19(2), 137-155.

Resilient students had greater involvement and satisfaction in their mathematics class, academic self concept, and achievement motivation than nonresilient students, and were less likely to have repeated a grade level.

Ach, Att, Ethn (MS)

Waxman, Hersholt C.; Huang, Shwu Yong L. (1997). Differences by level of technology use on students' motivation, anxiety, and classroom learning environment in mathematics. *Journal of Educational Technology Systems,* 25(1), 67-77.

This study examined whether sixth- and eighth-grade students' motivation, anxiety, and classroom learning environment in mathematics differed significantly according to the degree of implementation of technology in the mathematics classroom.

Tech, Anx, Soc, Att (MS)

Weber, William B., Jr.; House, Jess E. (1997). Have you heard of the standards? A middle grades survey. *Ohio Journal of School Mathematics,* 36, 12-18.

Authors studied the status of the mathematics reform effort in Ohio, specifically measuring the dissemination of the NCTM Standards and teachers' opinions of Ohio's Competency-Based Mathematics Model.

TBlf, TKnw, Curr (T, MS)

Weiss, Iris R. (1997, Summer). The status of science and mathematics teaching in the United States: Comparing teacher views and classroom practice to national standards. *ERS Spectrum,* 15(3), 34-39.

The 1993 Survey of Science and Mathematics Education, involving a national sample of 1,250 U.S. schools and 6,000 teachers, probed the status of science and mathematics education as they relate to NCTM and NRC standards. Although teachers reported instructional objectives consistent with reform goals, class activities were not well aligned with recommendations.

Tchg, Curr (T, K-12)

White, Paul A.; and others. (1997, February). Upgrading high school mathematics: A look at three transition courses. *NASSP Bulletin,* 81(586), 72-83.

This article describes three transitional mathematics courses designed to upgrade high school mathematics courses and lure more low-achieving students into college preparatory mathematics courses. Transcript data from 4,800 students showed that students took more challenging and useful mathematics, learned more, and improved self esteem.

Curr, Eqty (HS)

Wigfield, Allan; Eccles, Jacquelynne S.; Yoon, Kwang Suk; Harold, Rena D.; Arbreton, Amy J. A.; Freedman Doan, Carol; Blumenfeld, Phyllis C. (1997, September). Change in children's competence beliefs and subjective task values across the elementary school years: A 3-year study. *Journal of Educational Psychology,* 89(3), 451-469.

Change over three years in the competence beliefs and subjective task values in the domains of reading, mathematics, instrumental music, and sports was studied with approximately 615 predominantly white, middle-class elementary school children. There was moderate to strong stability in their beliefs. Exceptions and gender differences are discussed.

Att, Blf, Soc (EL)

Wilensky, Uri. (1997, July). What is normal anyway? Therapy for epistemological anxiety. *Educational Studies in Mathematics,* 33(2), 171-202.

This article presents two case studies of learners attempting to understand the concept of normal distribution. Conclusions are drawn about a Connected Mathematics learning environment that enables confrontation with epistemological anxiety and the features of modeling languages that enable learners to successfully investigate probability.

Stat, Anx, Prob, Lrng, Rep (SE)

Wilson, Margaret A.; Robinson, Gregory L. (1997, September). The use of sequenced count-by and constant time delay methods of teaching basic multiplication facts using parent volunteer tutors. *Mathematics Education Research Journal,* 9(2), 174-90.

This article presents a study exploring the effectiveness and efficiency of Constant Time Delay and Sequenced Count-By procedures in the teaching of multiplication facts using children (n=43) from grades 3-6 having parents as tutors. Both procedures were effective.

M/D, Soc, Curr (EL)

Wood, Bonnie S.; Brown, Lorrie A. (1997). Participation in an all-female Algebra I class: Effects on high school math and science course selection. *Journal of Women and Minorities in Science and Engineering*, 3(4), 265-77.

This article details a study in which Grade 9 females were assigned to either an all-female or coeducational algebra class. Findings indicate that the all-female intervention group demonstrated a greater gain in mathematics scores between grades 8-11 than the nonintervention group.

Curr, Gend, Plan, Ach, Assm, Alg (HS)

Wood, Terry; Sellers, Patricia. (1997, March). Deepening the analysis: Longitudinal assessment of a problem-centered mathematics program. *Journal for Research in Mathematics Education*, 28(2), 163-86.

This article presents longitudinal analyses of the mathematical achievement and beliefs of three groups of elementary pupils. Results indicate that the students with two years in problem-centered mathematics classes had significantly higher achievement.

Ach, PS, Tchg (EL)

Woodward, John; Baxter, Juliet. (1997, Spring). The effects of an innovative approach to mathematics on academically low achieving students in inclusive settings. *Exceptional Children*, 63(3), 373-388.

A year-long study of an innovative approach to mathematics, which emphasized in-depth problem solving and achievement of automaticity through mathematical games, found such methods to be viable for students with average and above average academic abilities, but students with learning disabilities or at risk students needed much greater assistance.

PS, LD, Tchg (K-12)

Wronkovich, Michael; Hess, Caryl A.; Robinson, James E. (1997, December). An objective look at math outcomes based on new research into block scheduling. *NASSP Bulletin*, 81(593), 32-41.

A study examining performance differences on the Ohio Colleges Early Math Placement Test of students receiving algebra and geometry instruction in a traditional, year-long structure versus students in an intensified block structure found the traditional structure more effective.

Curr, Tchg (HS)

Wulff, Mary Beth; Steitz, Jean A. (1997, Spring). Curricular track, career choice, and androgyny among adolescent females. *Adolescence*, 32(125), 43-49.

This study investigated psychological androgyny among (n=40) high school girls enrolled in either an upper-level mathematics class or a vocational-track cosmetology class. Results indicated that career choices are linked to sex role stereotypes.

Gend, Att (HS)

Wyndhamn, Jan; Saljo, Roger. (1997, December). Word problems and mathematical reasoning: A study of children's mastery of reference and meaning in textual realities. *Learning and Instruction*, 7(4), 361-382.

An experiment involving 14 small groups of 10-12 year-old Swedish students (usually three per group) showed that these students acting in groups and creating shared contextualizations were able to solve mathematics word problems calling for real-world knowledge. Research has shown students acting alone to have difficulty with the same types of problems.

PS, Grpg, Soc (EL)

Yelland, Nicola J.; Masters, Jennifer E. (1997, May). Learning mathematics with technology: Young children's understanding of paths and measurement. *Mathematics Education Research Journal*, 9(1), 83-99.

This article reports the performance and strategies of children working in one of three gender pairs (girls, boys, or boy/girl) on Geo-Logo tasks. The case studies presented reveal that the children showed a high level of engagement and learning in the Geo-Logo environment.

Comp, Meas, Tchg, Geom (EL)

Yerushalmy, Michal. (1997, July). Designing representations: Reasoning about functions of two variables. *Journal for Research in Mathematics*

Education. 28(4), 431-66.

This report describes generalization activity as an opportunity to learn about seventh graders' understanding of functions. Findings indicate that the modeling efforts of students allowed them to analyze their understanding of representations of quantities, relationships among quantities, and relationships among the representations of quantities in both single- and multivariable functions.

Knw, Manp, Rep (MS)

Yerushalmy, Michal. (1997). Mathematizing verbal descriptions of situations: A language to support modeling. *Cognition and Instruction*, 15(2), 207-264.

This study used a software environment to examine algebra students' attempts to reformulate narratives using verbal and iconic lexical sets.

Rep, Alg, Comp (EL)

Yoshida, Hajime; Verschaffel, Lieven; De Corte, Erik. (1997, December). Realistic considerations in solving problematic word problems: Do Japanese and Belgian children have the same difficulties? *Learning and Instruction*, 7(4), 329-338.

The activation of real world knowledge displayed by 91 Japanese fifth graders in solving school mathematics problems was compared to that of 75 previously-studied Belgian students. Children in both cultures had a similar tendency to neglect common sense knowledge and realistic considerations.

PS, CC, Knw, Ethn (EL)

Zaslavsky, Orit. (1997). Conceptual obstacles in the learning of quadratic functions. *Focus on Learning Problems in Mathematics*, 19(1), 20-44.

This study attempted to reveal students' (n=800) misconceptions regarding quadratic functions and identified conceptual obstacles that may impede students' understanding. Findings indicate that the conceptual obstacles identified were fairly pervasive.

Mscn, Tchg, Alg (SE)

Zazkis, Rina; Gunn, Chris. (1997). Sets, subsets, and the empty set: Students' constructions and mathematical conventions. *Journal of Computers in Mathematics and Science Teaching*, 16(1), 133-69.

The authors investigated students' understanding of the basic concepts of introductory set theory: set, set element, cardinality, subset, and the empty set.

Alg, Knw, PS, Lrng (EL)

Journals Cited

Action in Teacher Education (1)
Adolescence (1)
Adults Learning (England) (1)
AMATYC Review (1)
American Educational Research Journal (5)
Australian Journal of Education (1)
AWIS Magazine (1)
B.C. Journal of Special Education (1)
British Journal of Educational Technology (1)
British Journal of Special Education (1)
Canadian Journal of Education (1)
Child Abuse & Neglect: The International Journal (1)
Child Study Journal (1)
Clearing House (3)
Cognition and Instruction (4)
Community College Journal of Research and Practice (1)
Computers & Education (1)
Computers in the Schools (1)
Developmental Psychology (4)
Diagnostique (1)
Early Child Development and Care (1)
Early Childhood Education Journal (1)
Educational and Psychological Measurement (2)
Educational Evaluation and Policy Analysis (1)
Educational Measurement: Issues and Practice (1)
Educational Policy (1)
Educational & Psychological Measurement (2)
Educational Studies in Mathematics (23)
Educational Technology Research and Development (2)
Elementary School Journal (5)
ERS Spectrum (1)
European Early Childhood Education Research Journal (1)
Exceptional Children (1)
Focus on Learning Problems in Mathematics (12)
For the Learning of Mathematics (3)
Gender and Education (1)
Gifted Child Quarterly (1)
Hiroshima Journal of Mathematics Education (3)
Hispanic Journal of Behavioral Sciences (1)
Innovative Higher Education (1)
Instructional Science (1)
International Journal of Computers for Mathematical Learning (1)
International Journal of Early Years Education (1)
International Journal of Mathematical Education in Science and Technology (2)
Issues in Science and Technology (2)
Japanese Journal of Educational Psychology (1)
Journal for Research in Mathematics Education (26)
Journal of Applied Behavior Analysis (1)
Journal of Applied Research in the Community College (1)
Journal of College Science Teaching (1)
Journal of Computers in Mathematics and Science Teaching (9)
Journal of Computing in Childhood Education (1)
Journal of Counseling Psychology (2)
Journal of Curriculum and Supervision (1)
Journal of Education for Business (1)
Journal of Education for Students Placed at Risk (1)
Journal of Education for Teaching (1)
Journal of Educational Computing Research (1)
Journal of Educational Measurement (2)
Journal of Educational Psychology (5)
Journal of Educational Research (4)
Journal of Educational Technology Systems (1)
Journal of Experimental Child Psychology (2)
Journal of Experimental Education (1)
Journal of Learning Disabilities (1)
Journal of Research in Childhood Education (1)
Journal of Research in Science Teaching (1)
Journal of Research on Computing in Education (1)
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Journal of Secondary Gifted Education (1)
Journal of Teacher Education (1)
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Journal of the Learning Sciences (1)
Journal of Vocational Behavior (1)
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Lamp (1)
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Mathematics Education Research Journal (18)
Mathematics in School (1)
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Mathematics Teaching in the Middle School (4)
Measurement and Evaluation in Counseling and Development (2)
Mid Western Educational Researcher (1)
NASSP Bulletin (3)
Ohio Journal of School Mathematics (1)
PRIMUS (2)
Psychological Review (1)
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Remedial and Special Education (1)
Research and Teaching in Developmental Ed. (1)
Research in Middle Level Education Quarterly (1)
Research Papers in Education (2)
Review of Educational Research (1)
School Science and Mathematics (2)
Science and Education (1)
Science Education (1)
Science Scope (1)
Sex Roles: A Journal of Research (1)
Teachers College Record (1)
Teaching and Teacher Education (5)
Teaching Children Mathematics (5)
Teaching Mathematics and Its Applications (7)
The Journal of Mathematical Behavior (16)
Wisconsin Teacher of Mathematics (1)

Research Papers and Monographs in Mathematics Education Produced in 1997

Beth D. Greene & Gayle M. Millsaps, *The Ohio State University*

This section lists 91 papers and monographs in mathematics education research that were produced in 1997 and included in the ERIC database by the end of September, 1998. Each entry is coded (see *Key to Codes*) with one to three major topic codes (in bold type) and any number of minor topic codes, as well as the grade level code (in parentheses). Studies related to preservice or inservice teacher education are indicated by the appropriate codes (Prsv, Insv). The level designated for teacher education or teacher studies indicates the grade level(s) at which the intern or teacher participants teaches, followed by the level code, "T" for teacher or "TE" for teacher education. All entries are indexed by major codes at the end of the volume (see page 85).

A Shared Vision for Mathematics and Science Education in North Carolina. (1997). Chapel Hill, NC: UNC Mathematics and Science Education Network. [SE059992]

This publication documents the North Carolina Mathematics and Science Coalition's initial goals as a forum to stimulate and promote efforts to implement systemic reforms in mathematics and science education in North Carolina.

Insv, Plan, Soc (K-12, TE)

Achievements of primary 4 and primary 5 pupils in mathematics and science. Third International Mathematics and Science Study. (1997). Third International Mathematics and Science Study. Edinburgh, Scotland: Scottish Office Education and Industry Department. [SE060553]

This document reports the performance of Scottish primary students in mathematics and science on TIMSS with sections addressing performance in mathematics and science, examples of mathematics and science test items, Scottish features, and international comparisons in mathematics and science.

CC, Assm, Ach, Impl (EL)

Achieving world class standards in math and science. (1997). Washington, DC: National Alliance of Business. [SE060779]

Using the fourth- and eighth-grade results of the Third International Math and Science Study, this publication examines the perspectives on some of the factors that are important in influencing students' mathematics and science achievement.

Ach, Impl, CC, Curr (EL, MS)

Alaska Challenger Learning Center feasibility report. (1997). Juneau, AK: Alaska State Library, Government Publications. [SE060291]

This document is a feasibility report for establishing a Challenger Learning Center for Space Science Education to raise students' expectations of success, foster long-term interest, and motivate pursuit of studies in mathematics, science, and technology in the city of Kenai, Alaska.

Plan, Att, IC, Curr, Tech (K-12)

Allen, Nancy L., Jenkins, Frank, Kulick, Edward, & Zelenak, Christine A. (1997). *NAEP 1996 state assessment program in mathematics. Technical report*. Washington, DC: National Library of Education, Office of Educational Research and Improvement. [SE060933]

This report documents the National Assessment of Educational Progress design, administration, and data analysis procedures for the State Assessment.

Assm, Impl, Curr, Revw (K-12)

Arney, David C., (Ed.). (1997). *Interdisciplinary lively application projects (ILAPs)*. Washington, DC: Mathematical Association of America. [SE059900]

This teachers' guide explains and gives examples of Interdisciplinary Lively Application Projects (ILAPs). ILAPs are intended to integrate mathematics and other disciplines, to promote curricular reorganization by focusing on student growth in problem solving, and to promote faculty growth through ILAP development processes.

PS, IC, Tchg, Curr, Insv (K-12, T)

Astro Algebra: Builds confidence for math success. (1997). Redmond, WA: Edmark. [SE060630]

Astro Algebra software and teachers' guide of Edmark's Mighty Math Series, a comprehensive line of math software for kindergarten through ninth grade, is designed to help students make the connection between concrete and abstract mathematics as it introduces and reinforces algebra and pre-algebra concepts.

Matl, Alg, Comp, Tech, Curr (MS)

Attaining excellence: A TIMSS resource kit. (1997). Washington, DC: National Center for Education Statistics, U.S. Dept. of Education. [SE060930]

This kit provides communities with material needed to compare their local school with schools in other countries. Results from TIMSS are presented in a way to help improve educational programs.

Impl, CC, Curr, Plan, Soc (T)

Ayers, Jerry B., & Olberding, April H. (1997). *Ideas and activities for recycling education for grades K-12.* Cookeville, TN: Tennessee Technological University. [SE060980]

This is a collection of activities designed by science teachers attending a mini-course on current trends and issues surrounding recycling. Activities are coded for grade level and discipline and can be integrated with other school subjects.

IC, Insv, Comm, Curr, PS (TE)

Bae, Yupin. (1997). *Findings from the condition of education 1997 no. 11: Women in mathematics and science.* Washington, DC: National Center for Education Statistics (ED). [SE060785]

The essay reviews the most current data on women's progress in mathematics and science achievement, attitudes, course selection patterns, and college majors. Research suggests that the gender gap appears later in the United States, grade ten versus grade eight internationally, substantial gender differences exist in mathematical-sciences fields.

Ach, Gend, Revw, Att, Soc (ALL)

Biddulph, Fred, & Carr, Ken, (Eds.). (1997). *People in mathematics education.* Proceedings of the 20th Annual Conference of the Mathematics Education Research Group of Australasia, Inc., held at Rotorua, New Zealand, 7-11 July 1997, Vol. 1 and 2. [SE060555]

This document includes both volumes of the proceedings of the twentieth annual conference of the Mathematics Education Research Group of Australasia. Conference papers are included that focus on people in mathematics education and the interactions among them and the instructional materials they employ.

Tchr, Matl, Tchg, Impl (T)

Blank, Rolf K., & Langesen, Doreen. (1997). *State indicators of science and mathematics education 1997. State-by-state trends and new indicators from the 1995-96 school year.* Washington, DC: Council of Chief State School. [SE061077]

The purpose of this report is to assist state, national, and local policymakers and educators in making informed decisions. Indicators are provided to assess progress in improving mathematics and science education.

Curr, Assm, Plan, Impl (K-12)

Caldwell, Frank. (1997). *Bring functions and graphs to life with the CBL.* [SE061037]

This resource highlights the improvements in concept development possible when calculator-based laboratory systems and graphing calculators are used to teach the function concept.

GCal, M/CBL, Alg, Curr, Impl (SE)

Calhoun, David O., Bohlin, Carol, Bohlin, Roy, & Tracz, Susan. (1997). *The mathematics reform movement: Assessing the degree of reform in secondary mathematics classrooms.* [SE060901]

This paper explores the nature and status of mathematics reform, the connection between the movement and constructivist epistemology, the development of an assessment tool for measuring the degree of reform present in a classroom, and the potential for investigating the relationship between the degree of reform and achievement.

Curr, Rsch, Styl, Assm, Lrng, Revw (SE)

Campbell, Jay R., Voelkl, Kristin E., & Donahue, Patricia L. (1997). *Report in brief: NAEP 1996* *trends in academic progress.* Washington, DC: National Center for Education Statistics (ED). [SE060847]

Examining the major results from the 1996 National Assessment of Educational Progress science, mathematics, reading and writing long-term assessments, this report discusses overall patterns of performance for students at various ages drawn from information dating back to 1969.

Assm, Revw, Eqty, Ach, Impl, Soc (K-12)

Chaplin, Duncan D. (1997). *Earnings benefits of math and science in high school.* Paper presented at the Annual Meeting of the American Educational Research Association (Chicago, IL, April 10, 1997). [SE060248]

This study suggests that mathematics skills developed in high school are more strongly associated with later earnings for both college and non-college bound students than science or writing skills, and that harder high school mathematics courses are more strongly associated with later mathematics skills than easier ones.

Impl, Soc, Curr, Lrng (HS)

Course and Curriculum Development 1995 Awards. Course and Curriculum Development. (1997). Arlington, VA: National Science Foundation, Directorate for Education and Human Resources. [SE060153]

This book describes course and curriculum development projects in the subject areas of biology, chemistry, computer science, engineering, geosciences, interdisciplinary, mathematics, physics and astronomy, and social sciences that received awards in 1995 for their creativity, scientific and educational quality, and potential for utility at multiple institutions and national impact.

Curr, Plan, Insv, IC (PS)

Crosswalks: PACESETTER Mathematics and the National Standards. (1997). The College Entrance Examination Board. [SE060633]

This booklet gives a detailed explanation of the relationship between the Pacesetter mathematics program and the course through which it is implemented, Precalculus through Modeling, and the standards related to secondary school mathematics set forth in the NCTM Standards documents.

Curr, Rep, IC, Insv (SE)

Crow, Tracy, and Harris, Julia, (Eds.). (1997). *Calculator-active materials. ENC Focus for Mathmatics and Science Education, Volume 4, Issue 2, 1997.* Columbus, OH: Eisenhower National Clearinghouse. [SE060122]

This issue describes calculator-active materials in the Eisenhower National Clearinghouse (ENC) collection including the calculators and accompanying activity books. Among them are fraction calculators, graphing calculators, and calculators that perform symbolic algebraic, differential, and integral manipulations; data collection and statistical functions,and/or containing interactive geometry programs.

Cltr, GCal, Matl, Insv, Geom (ALL)

Crow, Tracy, (Ed.), and others. (1997). *New approaches to assessment in science and mathematics.* Columbus, OH: Eisenhower National Clearinghouse. [SE059661]

This report serves as a guide to instructional materials that utilize some form of alternative assessment and focus on mathematics, science, and integrated topics. The products included utilize one or more of the following means of student assessment: portfolios, journals, interviews, surveys, performance, and rubrics.

Assm, IC, Matl, Tchg (K-12)

Denoya, Laila E., (Ed.), and others. (1997). *The National Science Foundation Summer Science Camps: Leaving a legacy of successes.* Arlington, VA: National Science Foundation, Directorate of Education and Human Resources. [SE060236]

This book describes 122 Summer Science Camps funded from 1992 to 1996 by the NSF as an early intervention strategy to enable students from underrepresented groups in scientific and technical careers to develop their interest in science and mathematics and to encourage their consideration of such careers.

Eqty, Soc, Att, IC (K-12)

Directory of mathematics-based intervention projects. (1997). The Mathematical Association of America. [SE060631]

This directory for students and faculty of extracurricular mathematics-based intervention projects sponsored by colleges and universities or conducted by other organizations provides information on the type of project, recruitment area, total students/grades, total staff, application deadline, project dates, cost to student, and stipend and scholarship availability.

Eqty, Curr, Soc, Ethn (SE, PS)

Directory of NSF-supported Young Scholars Projects. Summer 1997, academic year 1997-98. (1997). Arlington, VA: National Science Foundation, Div. of Elementary, Secondary, and Informal Education. [SE060109]

This directory lists the National Science Foundation Young Scholars projects scheduled for 1997 that take place at sites throughout the United States which are designed to stimulate and extend the interests in science and mathematics of students entering grades seven through twelve.

Eqty, Att, Soc, PS, Curr (SE)

Doig, Brian, & Lokan, Jan. (1997). *Learning from children: Mathematics from a classroom perspective. ACER Research Monograph No. 52.* Melbourne, Australia: Australian Council for Educational Research. [SE060531]

In this monograph educational experts contribute their views on what the Basic Skills Testing Program (BSTP) results indicate about children's learning and understanding of mathematics, with an emphasis on findings that will be of most significance to classroom teachers. Commentaries by practicing teachers are included.

Impl, Assm, Lrng, Gend (K-12)

Dossey, John A. (1997). *Essential skills in mathematics: A comparative analysis of American and Japanese assessments of eighth-graders.* Washington, DC: National Center for Education Statistics, Office of Research and Improvement. [SE059968]

This report compares tests developed by governmental agencies designed to mirror the basic curricula currently being offered to Japanese and American eighth graders, the expectations based on the curriculum, and student performance on the included items.

Assm, Curr, CC, Impl, Ach (K-12)

Dubinsky, Ed, (Ed.). (1997). *Readings in cooperative learning for undergraduate mathematics.* Washington, DC: Mathematical Association of America. [SE060587]

This collection of papers, selected by Project CLUME (Cooperative Learning in Undergraduate Mathematics Education), on the use of cooperative-learning activities in undergraduate mathematics courses is organized into categories around constructivism and the teachers' role, research and effectiveness, and implementation issues, and includes commentaries and discussion questions.

Grpg, Tchg, Revw, Lrng, Insv, Rsch (PS)

Echols, Jean C., Hosoume, Kimi, & Kopp, Jaine. (1997). *Eggs eggs everywhere. Teacher's guide.* Berkeley, CA: GEMS, University of California-Berkeley, Lawrence Hall of Science. [SE060843]

Included are interdisciplinary activities that provide children with an understanding of the characteristics of organisms, outlining the life cycles of organisms, and showing how organisms relate to their environments. The unit interweaves life science with literature, mathematics, and physical sciences.

Grpg, IC, PS, Patt (EC)

Ediger, Marlow. (1997). *Current concepts in teaching mathematics.* [SE059731]

This survey of the literature in mathematics education on trends in learning opportunities, objective selection, and evaluation procedures focuses on equity in curriculum, access to good teachers, and access to quality learning experiences.

Eqty, Gend, Impl, Curr, Phil, Assm (K-12)

Ferrini-Mundy, Joan, & Schram, Thomas, (Eds.). (1997). *The recognizing and recording reform in mathematics education project: Insights, issues, and implications. Monograph number 8.* Reston, VA: National Council of Teachers of Mathematics. [SE060974]

This monograph presents findings from the Recording Reform in Mathematics Education project, which was designed to assess the influence of, depth of knowledge about, and interpretation of the NCTM's standards documents. The document cover the background, case studies, and conclusions drawn.

Curr, Impl, Tchg, Revw, TKnw (K-12, T)

Fostering algebraic and geometric thinking: Selections from the NCTM standards. (1997). Reston, VA: National Council of Teachers of Mathematics. [SE060941]

These excerpts from the NCTM standards can be used in connection with the TIMSS Resource Kit to offer context for discussing the teaching of algebra and geometry.

Insv, Styl, Tchg, Alg, Curr, Geom (TE, K-12)

Goodman, Jan M., & Kopp, Jaine. (1997). *Group solutions, too! More cooperative logic activities for grades K-4. Teacher's guide.* Berkeley, CA: GEMS, University of California-Berkeley, Lawrence Hall of Science. [SE060842]

This is the second volume of Great Explorations in Math and Science, a collection of compelling and educationally-powerful cooperative logic activities for grades K-4.

Comm, Grpg, PS, Matl, Nsns, Patt (EC)

Harris, Julia (Ed.). (1997). *Professional development for math and science. ENC focus, volume 4, issue 4, 1997.* Columbus, OH: Eisenhower National Clearinghouse. [SE060755]

Thirty-one resources from the Eisenhower National Clearinghouse are presented as possible professional development opportunities. These entries can be used in settings such as self- and group study, consultation with peers and supervisors, inquiry into practice, or within an action research project.

Insv, Tchg, Rsch, Curr (TE)

Harris, Julia (Ed.). (1997). *SSRP: Software for problem solving and inquiry in grades K-4.* Columbus, OH: Eisenhower National Clearinghouse. [SE060754]

Evaluation protocols were established and used to review the educational merit of software programs. Mathematics and science programs (n=127) were examined for their ability to meet national and state reform standards and promote problem solving and inquiry.

Matl, Tech, PS, MMed, CAI (EC)

Harris, Julia (Ed.). (1997). *Using children's literature in math and science.* Columbus, OH: Eisenhower National Clearinghouse. [SE060947]

This volume presents resources related to the integration of children's literature with mathematics and science curriculums. One section of the book focuses on how to find information, the second presents and explains teacher resources, and the third lists and summarizes relevant literature.

Curr, IC, Matl, Lang, Soc (EC)

Helping your child reach the new standards in mathematics, science, and technology: Core curriculum content standards. A guide for New Jersey parents. (1997). New Brunswick, NJ: New Jersey Mathematics Coalition. [SE061059]

The aim of this booklet is to share with parents the standards adopted by the New Jersey State Board of Education. Guides for parents to help children reach the standards are presented along with several activities related to the new standards.

Curr, Impl, Soc, Assm, Matl, Phil (K-12)

Hiebert, James, and others. (1997). *Making sense: Teaching and learning mathematics with understanding.* Portsmouth, NJ: Heinemann. [SE060279]

This book describes a consensus in mathematics education about the essential features of classrooms which encourage learning mathematics with understanding and provides examples of several classrooms that exhibit these features.

Impl, Lrng, Tchg, Insv, Prsv (TE)

Hinzman, Kristina P. (1997). *Use of manipulatives in mathematics at the middle school level and their effects on students' grades and attitudes.* Master's Thesis, Salem-Teikyo University. [SE060534]

This study examines the impact of hands-on activities in two middle school pre-algebra classrooms on mathematics scores, students' opinions of mathematics, female students' intentions of continuing higher mathematics classes in high school, and parental assistance on students' homework.

Manp, Soc, Alg, Gend, Att, Lrng (MS)

House, Peggy, (Ed.). (1997). *Mission Mathematics: Linking Aerospace and the NCTM Standards, 9-12.* Reston, VA: National Council of Teachers of Mathematics. [SE060321]

This 9-12 teachers' guide is designed to present mathematical problems and tasks that focus on the National Council of Teachers of Mathematics (NCTM) Curriculum and Evaluation Standards in the context of aerospace activities.

IC, PS, Matl (HS)

Hynes, Mary Ellen, (Ed.). (1997). *Mission Mathematics: Linking aerospace and the NCTM Standards, K-6.* Reston, VA: National Council of Teachers of Mathematics. [SE060320]

This K-6 teachers' guide is designed to present mathematical problems and tasks that focus on the National Council of Teachers of Mathematics Curriculum and Evaluation Standards in the context of aerospace activities.

IC, PS, Matl (EL)

Introduction to TIMSS: The third international mathematics and science study. (1997). Washington, DC: Office of Educational Research and Improvement (ED). [SE060938]

This overview helps educators and others in states, communities, and schools to use TIMSS as a starting point. The overview, key findings section, and supporting materials help communities and states use TIMSS to examine their own practices from an international perspective.

CC, Impl, Curr, Assm, IC, Insv (K-12)

Jarrett, Denise. (1997). *Inquiry strategies for science and mathematics learning: It's just good teaching.* Portland, OR: Northwest Regional Educational Lab. [SE060765]

This publication is intended to furnish K-12 teachers with both research-based rationale and recommendations for effective techniques to be applied in classrooms. Information was gathered on available resources, organizations, on-line offerings, and supplies.

Curr, Matl, Impl, Lrng, PS (K-12)

Jenkins, Robert H. (1997). *61 cooperative learning activities in Algebra 1.* Portland, ME: J. Weston Walch, Publisher. [SE060375]

This teachers' guide provides cooperative learning activities to complement an Algebra I program that are designed so that they can be augmented to suit the population of the class, the style of the teacher, and the locality of the school.

Grpg, Alg, Matl, Tchg (HS)

Johnson, Virginia M. (1997). *Investigating the relationship between procedural and mathematical writing responses.* [SE059964]

This study examined the relationship between procedural writing and mathematical writing of third- and fourth-grade students. The results were examined in terms of the implications for the use of student mathematical-writing products as a reflection of mathematical conceptual understanding.

Writ, Assm, Lang, Tchg, Impl (EL)

Kenney, Patricia Ann, & Silver, Edward A. (1997). *Results from the Sixth Mathematics Assessment of the National Assessment of Educational Progress.* Reston, VA: National Council of Teachers of Mathematics. [SE060319]

This book contains interpretive reports based on results from the mathematics assessments of the National Assessment of Educational Progress. The results are summarized for different grade levels and subgroups of students by gender and race/ethnicity.

Impl, Ethn, Ach, Blf, Att, Gend (K-12)

Kestner, Michael (Ed.), and others. (1997). *Geometry strategies, Grades 6-8.* Raleigh, NC: North Carolina State Dept. of Public Instruction. [SE059919]

This teachers' guide of informal geometry contains activities intended to provide students with opportunities to investigate the environment from a geometric perspective, to construct connections between related mathematics and other content areas, and to solve problems in a geometric context.

Geom, PS, IC, Meas, Rep, Matl (MS)

Kestner, Michael (Ed.), and others. (1997). *Resources for algebra.* Raleigh, NC: North Carolina State Dept. of Public Instruction. [SE059920]

In addition to providing weekly planning resources and classroom activities, this teachers' guide for teaching algebra includes algebra writing prompts that require students to identify real world situations or problems where algebra is an important tool in their investigation and explanation.

Alg, Writ, IC, Matl (K-12)

Kopp, Jaine, & Hosoume, Kimi. (1997). *Treasure boxes. Teacher's guide.* Berkeley, CA: GEMS, University of California-Berkeley, Lawrence Hall of Science. [SE060841]

This series of mathematical activities utilizing a collection of small objects are designed to allow students to observe, analyze, organize, communicate, record, and draw conclusions in many mathematical areas including geometry, patterns, number sense, measurement, discrete mathematics, and statistics.

Manp, Matl, Rep, Comm, Stat, Nsns (EC)

Krantz, Steven G., and others. (1997). *Techniques of problem solving.* Providence, RI: American Mathematical Society. [SE060589]

This textbook on the basic principles of problem solving addresses the topics of learning to translate verbal discussion into analytical data, learning problem solving methods for attacking collections of analytical questions or data, and building a personal arsenal of solved problems and internalized problem-solving techniques.

PS, Tech, Lrng, Curr (ALL)

Lee, Patrick. (1997). *A first year evaluation study of integrated math and integrated science curricular programs in an inner city high school.* [SE060953]

The findings presented in this report focus on a program to promote scientific literacy, critical thinking, and communication through the integration of mathematics and scientific study.

Curr, IC, Revw, Att, Comm, PS (HS)

Local systemic change project directory. (1997). Arlington, VA: National Science Foundation, Directorate for Education and Human Resources. [SE060749]

This is a directory of Teacher Enhancement Programs that provide K-12 school systems with the tools to reform science, mathematics, and technology education. Summaries of 47 projects in 23 states are included.

IC, Insv, TKnw, Curr, Tchg (K-12, TE)

Malmstrom, Jay A. (1997). *The return of Dangerous Dan: Further adventures in recreational mathematics.* [SE060871]

This paper includes a collection of six activities for mathematics classrooms that strengthen arithmetic, modular arithmetic, limit cycles, graph theory, pairings, combinations, cyclic groups, induction, and sequences.

AdvM, Matl, Arth, Patt (HS, PS)

Mastering challenging mathematics by the end of eighth grade. (1997). Washington, DC: Department of Education (ED). [SE060979]

This pamphlet examines results from the TIMSS report which show that United States students need to progress to more advanced mathematics in grades four to eight. Other findings and example tasks are included to support the need for higher mathematics literacy.

CC, Curr, Impl, Alg, Geom, PS (K-12)

Mathematics and science content standards and curriculum frameworks: States progress on development and implementation, 1997. (1997). Washington, DC: National Science Foundation. [SE060846]

From a study examining the content and quality of state frameworks and standards, this report focuses on current and emerging policy issues pertaining to the implementation of standards-based reform.

Tchg, Curr, Impl (K-12)

McNeely, Margaret E. (Ed.), Blank, Rolf, Earle, Janice, Nohara, David, Roseman, Jo Ellen, & Schmidt, William. (1997). *Guidebook to examine school curricula.* Washington, DC: Office of Educational Research and Improvement (ED). [SE060943]

These five methods of analyzing school curricula were designed for educators, but can be used by community members. The methods were selected because each reflect a unique framework and/or set of standards and focus on how instructional materials address all students' needs.

Assm, Curr, Impl, Lrnr, Matl (K-12)

Miller-Whitehead, Marie. (1997). *An analysis of science scale scores for grades 2-8 in Tennessee for 1990-1994.* [SE060722]

This research examined student science scores from mandated annual testing of all students in grades 2 through 8 in Tennessee to find evidence for meeting the stated goals of the Tennessee Education Improvement Act (EIA) of 1991 to engender equity and achievement for all students.

Assm, Eqty, Ach (EL)

Moderator's guide to eighth-grade mathematics lessons: United States, Japan, and Germany. (1997). Washington, DC: Office of Educational Research and Improvement (ED). [SE060940]

This kit can be used to guide and plan inservice programs in order to examine and discuss the TIMSS results. Included is a videotape of sample lessons from various countries, frequently asked questions, background information, and other materials.

Insv, CC, Impl, Alg, Geom, Tchg (TE, MS)

Monroe, Eula Ewing, & Pendergrass, Michelle R. (1997). *Effects of mathematical vocabulary instruction on fourth grade students.* [SE060902]

This study compared two types of vocabulary instruction, one of which was an integrated model combining a modified Concept of Definition organizer with the Frayer discussion model. This approach proved to be an effective method for teaching mathematics. The second was a definition-only model.

Lang, Oral, Styl, IC, Meas (EL)

Moon, Jean. (1997). *Developing judgment: Assessing children's work in mathematics.* Portsmouth, NJ: Heinemann. [SE060271]

This book provides a framework for organizing study groups to help teachers build their expertise in judging children's mathematical work based on the findings of a project study group of elementary teachers and principals on alternative mathematical assessment in the elementary school.

Insv, Assm, Grpg, Tchg (TE, EL)

Moseley, Bryan, & Brenner, Mary E. (1997). *Using multiple representations for conceptual change in pre-algebra: A comparison of variable usage with graphic and text based problem.* Washington, DC: Office of Educational Research and Improvement (ED). [SE060760]

This study examined how the type of instruction affected the ability of middle school students (n=27) to work with algebraic variables and their notations. The results indicate that the group receiving the experimental curriculum were more likely to demonstrate algebraic reasoning.

Alg, Curr, Tchg, Rep (MS)

MSEN long-range goals. University of North Carolina Mathematics and Science Education Network 1996-2000. (1997). Chapel Hill, NC: UNC Mathematics and Science Education Network. [SE059984]

This publication documents The University of North Carolina (UNC) Mathematics and Science Education Network (MSEN) vision, mission statement, and long-range goals toward applying the resources of UNC to strengthen mathematics and science education in K-16 schools throughout the state.

Insv, Plan, Rsch (T, ALL)

Mullis, Ina V.S. (1997). *Benchmarking to international achievement.* Washington, DC: Office of Educational Research and Improvement (ED). [SE060939]

This booklet illustrates how the different types of information found in the international reports can provide a springboard for in-depth reflection about the strengths and weaknesses of the education efforts in the United States at the national, state, and local levels.

Ach, Assm, CC, Curr, Impl, Revw (K-12, T)

Myers, Robert E. (1997). *Mind sparklers. Book 1 for grades K-3.* Waco, TX: Prufrock Press. [SE060892]

The 40 activities in this book were designed to persuade students to think critically and creatively using E. Paul Torrance's creative thinking abilities.

Comm, IC, Styl, Curr, Lrng, PS (EC)

Myers, Robert E. (1997). *Mind sparklers. Book 2 for grades 4-8.* Waco, TX: Prufrock Press. [SE060893]

The activities in this book were designed to encourage students to perceive what is going on around them, to be both receptive to and critical of the ideas of others, to analyze problems, to elaborate upon ideas, to explore possibilities, and to see relationships.

Comm, IC, PS, Curr, Plan (MS)

National education goals report: Building a nation of learners 1997. (1997). Washington, DC: National Education Goals Panel. [SE060986]

Findings of the NAEP panel's seventh report showed a need to set tougher standards comparable to the best in the world, align education system with the standards, and strengthen teacher knowledge and skills.

Curr, TKnw, Impl, Assm, Lrng, Styl (K-12)

National education goals report summary 1997: Mathematics and science achievement for the 21st century. (1997). Washington, DC: National Education Goals Panel. [SE060945]

This report is the seventh in a series designed to measure the amount of progress made by the nation and the states toward the eight National Education Goals. The report showed that American students continue to improve, but a problem area exists with eighth-grade mathematics.

Ach, Assm, CC, Impl (K-12)

National Network of Eisenhower Regional Consortia and National Clearinghouses Mathematics and Science Education: 1997 report. (1997). Columbus, OH: Eisenhower National Clearinghouse. [SE059667]

This report describes the methods the National Network of Eisenhower Regional Consortia and National Clearinghouses use to attain their objectives. Topics include: collaboration and communication, programs and curricula, professional development, curriculum frameworks, technology, equity, informal education entities, community outreach, and access information.

Insv, IC, Tech, Curr, Eqty (TE, K-12)

Nolan, Deborah (Ed.). (1997). *Women in mathematics: Scaling the heights.* Washington, DC: Mathematical Association of America. [SE060932]

Mills College Summer Mathematics Institute sponsors a conference and program designed to encourage and prepare undergraduate women to attend graduate school in the mathematical sciences. This book is a collection of speeches from the conference, examples of courses, descriptions of summer programs, and a survey of mathematics majors.

Att, Blf, Gend, AdvM, Gift (PS)

O'Connell, Susan R. (1997). *Glyphs! Data communication for primary mathematicians.* Parsippany, NJ: Good Apple. [SE059203]

This teachers' guide contains activities that allow elementary students to collect, display, and interpret data using glyphs (pictorial representations of data). The activities are designed to build data analysis and communication skills, and to stimulate students' mathematical reasoning as they compare, contrast, and draw conclusions.

Stat, Matl, Vis, Patt, Rep (EL)

Observation matrix for on-going assessment and end of the year evaluation. Mathematics grades 1-8. (1997). Raleigh, NC: Public Schools of North Carolina. [SE060286]

This kit contains observation matrices for on-going assessment and year-end evaluation for grades 1 through 8 divided into the areas of numeration, geometry, patterns, measurement, problem solving, data, and computation, and employing four levels of performance proficiency indicators.

D/R, Matl, Assm (EL)

Pfenning, Nancy. (1997). *Chances are...making probability and statistics fun to learn and easy to teach.* Waco, TX: Prufrock Press. [SE060891]

An introduction to probability and statistics suitable for students of various ages and abilities, these activities cover areas including: counting, probabilities, probability distribution, proportion histograms and normal distribution, beginning statistics, standard deviation, sampling, and handling data in different forms.

Prob, RaPc, Stat, Patt, Rep, Gift (ALL)

Pickwick, Alan. (1997). *Earth and beyond.* Hatfield, United Kingdom: Association for Science Education. [SE060715]

This teachers' guide of astronomy projects and activities, fulfilling the requirements of the National Curriculum in England and Wales and the 5-14 Guidelines in Scotland, includes discussion questions and cross-curricular themes linking geography (time-zones, continents and poles), mathematics (distances and scales), and art and drama.

IC, Curr, Matl (EL)

Primary mathematics. (1997). Norman, OK: Saxon Publishers. [SE060105]

This primary mathematics series emphasizes manipulative and mental mathematics via an incremental, integrated, multisensory approach to teaching mathematics. New objectives are introduced through group activities. Concepts are practiced in each succeeding lesson. A scripted teachers' manual provides activities, questioning strategies, and grade-level appropriate language.

Matl, Manp, Curr, Tchg (EC)

Pursuing excellence: Eighth-grade findings from the Third International Math and Science Study. A video presentation. (1997). Washington, DC: Office of Educational Research and Improvement. [SE060446]

This videotape summarizes TIMMS's key findings at the eighth-grade level with respect to curriculum and learning expectations, teaching, teachers' lives, and students' lives.

Soc, Ach, CC, Curr, Tchg (K-12, T)

Question of reform: Report on Project Kaleidoscope 1996-1997. (1997). Washington, DC: Project Kaleidoscope. [SE060537]

This report overviews the reform of undergraduate science education at colleges and universities that are involved in Project Kaleidoscope (PKAL) from 1996 - 1997. The report is a distillation of questions that institutions successful in conceiving, implementing, and sustaining reform have addressed.

Curr, Plan, Impl (PS)

Richardson, Kathy. (1997). *Math time: The learning environment.* Norman, OK: Educational Enrichment, Inc. [SE060882]

The purpose of this book is to help primary teachers establish a classroom that is supportive of an active, meaning-based approach to teaching and learning mathematics. It proposes that all classrooms should acknowledge and value the child's effort to grow and to learn.

CIIn, Curr, Tchg, Styl, TAtt (EC)

Rochowicz, John A., Jr. (1997). *A technological view of modular congruences.* [SE060323]

This paper describes various ways to compute modular congruences on a spreadsheet. Macros are discussed that provide the user with automatic computation of congruence. A drill for the practice of calculating congruences is also included.

AdvM, Comp, Matl, Tech (PS)

Ryan, Walter F. (1997). *River Falls Mall math trails: Connecting elementary mathematics to the world.* Indiana University Southeast Improvement of Learning Committee. [SE060292]

This collection of ungraded activities on topics in geometry, concept of number, algebra, measurement, graphing, statistics, and probability demonstrates how the study of elementary mathematics can be extended beyond the school and how it can involve teachers and students in investigative, problem-based experiences.

PS, IC, Tchg, Matl (EL)

Schiro, Michael. (1997). *Integrating children's literature and mathematics in the classroom: Children as meaning makers, problem solvers, and literary critics.* New York: Teachers College Press. [SE059604]

This book explores relationships between mathematics, children's literature, and literary criticism, and focuses on ways of using trade books to provide children and educators with instructional experiences that integrate the study of mathematics with children's literature.

IC, Tchg, Matl, Lang (EL)

Schoenfeld, Alan, (Ed.). (1997). *Student assessment in calculus. A report of the NSF Working Group on Assessment in Calculus.* Washington, DC: Mathematical Association of America. [SE060044]

The purpose of this report is to outline the state of the art of calculus assessment and to indicate directions for explorations in assessment that will enable educators to gain a deeper understanding of student learning and to improve student learning in calculus instruction.

Calc, Assm, Lrng, AdvM (HS)

Schramm, Susan. (1997). *Related webs of meaning between the disciplines: Perceptions of secondary students who experienced an integrated curriculum.* Paper presented at the Annual Meeting of the American Educational Research Association (Chicago, IL, March, 1997). [SE060193]

This paper describes a study of the perceptions of certain secondary students who experienced an integrated curriculum that combined the subjects of geometry and visual art in ways that reflected real world applications of mathematics and art in industry.

IC, Impl, Lrng, PS, Soc (SE)

Shockey, Brenda P. (1997). *The effects of varying retention intervals within a block schedule on knowledge retention in mathematics.* [SE060954]

This study examined the affects of time between courses in schools with block schedules. Results showed large differences in Algebra II skills and concepts retained at the beginning of the pre-calculus course that followed, but no significant difference were measured at the end of the second course.

Ach, Assm, Alg, Lrnr, Plan (HS)

Spadano, Joseph W., Zeidler, Dana L., & Chappell, Michaele F. (1997). *Advancing ownership of understanding and responsibility through homework in mathematics education.* [SE060935]

Differences between teacher-centered and learner-centered educational orientations and their implications in regards to ownership of understanding and responsibilities are examined. Also presented is a rationale policy of homework which may be able to bring about goals consistent with current reform initiatives, without radically altering curriculum or pedagogy.

Curr, Styl, Tchr, Lrng, Soc, Tchg (K-12)

Stepanek, Jennifer. (1997). *Science and mathematics standards in the classroom: It's just good teaching.* Portland, OR: Northwest Regional Educational Lab. [SE060766]

This publication summarizes the vision and rationale presented in the national standards documents and current literature. Strategies and resources for implementing a standards-based teaching approach are the main focus of this report.

Curr, Styl, Tchg, Impl, Lrng, Revw (K-12, T)

Stepanek, Jennifer, & Jarrett, Denise. (1997). *Assessment strategies to inform science and mathematics instruction: It's just good teaching.* Portland, OR: Northwest Regional Educational Laboratory. [SE061102]

This publication contends that using assessment for informing and improving instruction is key to effective teaching and learning while serving as a fundamental building block for other evaluation activities. This document includes research, strategies, and lists of organizations and resources.

Ach, Assm, Tchg, Curr, Revw, Writ (K-12)

Stockard, James W., Jr., & Snyder, Vaughn. (1997). *Activities for elementary school mathematics.* Prospect Heights: Waveland Press. [SE060235]

This teachers' guide contains activities designed to help teachers enrich the mathematical experiences of all elementary school children toward fulfillment of the NCTM Standards. The appendix contains an annotated bibliography of children's books which integrate mathematical concepts with their storyline.

Matl, NSns, IC, PS, Geom (EL)

Taylor, Pamela A. (1997). *Using writing journals in the mathematics class.* [SE061103]

In this article, writing is shown to stimulate and enhance learning. Journals help students learn to communicate mathematically, give a medium for use of mathematical terminology, add clarification, and act as an instructional tool for teachers.

Comm, Patt, Writ, Lang, Mtcg, Tchg (K-12)

Thorson, Annette (Ed.). (1997). *The guidebook of federal resources for K-12 mathematics and science 1997-98.* Columbus, OH: Eisenhower National Clearinghouse. [SE060948]

This comprehensive national directory of federal offices, programs, and facilities supporting K-12 mathematics and science education informs educators and the public while increasing access to programs.

Matl, Soc, Rsch (K-12)

Trentacosta, Janet, & Kenney, Margaret J., (Eds.). (1997). *Multicultural and gender equity in the mathematics classroom: The gift of diversity. 1997 Yearbook.* Reston, VA: National Council of Teachers of Mathematics. [SE060322]

This 1997 NCTM yearbook presents a vision of how research and classroom practices related to multicultural diversity and gender equity can reinforce each other to ensure a powerful mathematics program for all students regardless of their gender, race, ethnicity, or socioeconomic situation.

Eqty, Tchg, Impl, Soc, Assm, Curr (TE, K-12)

Uncovering math with your family: Fun activities in the world around you. (1997). Dallas, TX: Texas Instruments. [SE060112]

This family mathematics activity guide—organized into four themes: Math in Your Home, Math in Your Neighborhood, Math On the Go, and Math in the Store—is designed to help parents nurture children's natural curiosity as they uncover mathematics in the world around them.

Soc, Matl, IC, PS (EC)

University of Chicago School Mathematics Project 1997-98. (1997). Chicago, IL: University of Chicago School Mathematics Project. [SE061035]

The University of Chicago School Mathematics Project has devoted itself to examining curriculum and teacher training in order to promote changes which lead to improved achievement. Included in this document is information on the project, available materials, and contact persons.

Curr, Insv, Matl, PS, Revw, Tech (K-12)

White, Jacci Wozniak, & Norwich, Vicki Howard. (1997). *Computer activities for college algebra and precalculus.* [SE060676]

This paper presents conceptual calculus exercises using different mathematics education software which include instructions on the use of software to highlight a specific mathematical concepts and reviews ISETL, Derive, Geometer's Sketchpad, TI-82, TI-83, TI-85, TI-86, TI-92, and CBL as mathematics education tools.

Alg, Calc, Tech, Comp, GCal (PS)

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Every dissertation, journal article, paper, and monograph listed in the preceding three sections is indexed by 1-3 **Major** and any number of *Minor* topic codes (see Key to Codes). The 75 major codes have been clustered into 20 groups of related topics for the purpose of indexing. Only the **Major** codes are listed after each entry in the index.

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Biddulph	Tchr, Matl
Local	IC, Insv, TKnw
National	Curr, TKnw, Impl
Spadano	Curr, Styl, Tchr

Arithmetic (Arth); Addition, subtraction (A/S); Decimals (Decm); Equivalence, proportion (Eqv); Estimation (Est); Fractions, rational numbers (Frac); Integers (Int); Multiplication, division (M/D); Number sense (NSns); Place Value (PlcV); Ratio, proportion, percent (RaPc); Whole numbers (Whol)

Dissertations and theses

Bosch	RaPc, Phil
Irwin	Decm, Rep
Jong	Soc, NSns
Kelleher	NSns, Lrng
Sallee	Writ, Frac
Slaughter	M/D, Grpg
Tsai	Soc, Arth, Knw
Walder	Soc, Arth
Whalen	Lrng, Arth
Yang	NSns, Arth

Articles

Aksu	Frac, Ach, Curr
Behr	Prsv, Frac, TKnw
Belfiore	D/R, M/D
Berenson	Ethn, Lang, M/D
Bruno	A/S, TKnw
Cawley	Arth, D/R
Deblois	Styl, NSns
DeFranco	M/D, PS, Soc
Dowker	Est, A/S
English	PS, NSns
Fuson	Ethn, Curr, PlcV
Gay	NSns, RaPc, Knw
Kamii	Arth, Tchg
Kaminski	NSns, Prsv
Kiefer	M/D, Lrng
Koechlin	NSns
LeFevre	CC, M/D
Leung	Arth, PS, TKnw
Moloney	Frac, Mscn
Mukhopadhyay	Lrng, Arth, Nsns
Mulligan	PS, Knw, M/D
Mura	NSns, Lrng, Calc
Power	Arth, Mscn
Ruthven	Cltr, NSns, Att
Schmidt	Alg, Tchg, Arth
Sophian	Frac, Lrng
Steiner	Tchg, Frac
Suggate	NSns, Lrng
Towse	Lrng, Lang, NSns
Varelas	NSns, Manp, PlcV
Wilson	M/D, Soc

Papers

Pfenning	Prob, RaPc, Stat
Stockard	Matl, NSns, IC

Assessment, evaluation (Assm)

Dissertations and theses

Barbera	Assm, Tchg
Benson	Assm, Insv
Clark	Assm, Ach
Culbertson	Assm, D/R
Elliott	Ach, Assm
Hughes	Matl, Assm
Keck	Assm, Rep
Moody	Geom, Assm
Pryor	Assm
Rogers	Assm
Salmon	Assm, Curr
Smith	Assm, Curr
Sottile	Assm, Curr
Whitus	Ach, Assm

Articles

Adams	Alg, GCal, Assm
Allinder	Curr, Assm, D/R
Anku	Assm, PS, Curr
Bennett	Assm, PS, Comp
Bennett	PS, Assm
Bers	Ach, Att, Assm
Birenbaum	Ethn, Assm
Borko	Tatt, Assm
Brookhart	Ach, Soc, Assm
Cai	CC, Assm
Chandler	CC, Ach, Assm
Elmore	Assm, Ach, CC
Haeck	Assm, Ach
Jitendra	Curr, Assm
Jones	Prob, Curr, Assm
Lynch	Comm, Assm
Naizer	Assm, Prsv
Pajares	Assm, Att, PS
Parker	Tchg, Assm, PS
Schmidt	Curr, CC, Assm
Shermis	Curr, Rsch, Assm

Papers

Achievements	CC, Assm, Ach
Allen	Assm, Impl
Blank	Curr, Assm, Plan
Campbell	Assm, Revw, Eqty
Crow	Assm, IC, Matl
Doig	Impl, Assm
Dossey	Assm, Curr, CC
Johnson	Writ, Assm, Lang
McNeely	Assm, Curr, Impl
Miller-Whitehead	Assm, Eqty
Moon	Insv, Assm, Grpg
Mullis	Ach, Assm, CC
National	Ach, Assm
Schoenfeld	Calc, Assm, Lrng
Shockey	Ach, Assm, Alg
Stepanek	Ach, Assm, Tchg

Calculators (Calc); Computer-assisted instruction (CAI); Computers (general) (Comp); Graphing calculators (GCal); Microcomputer, microcalculator based labs (M/Cbl); Multimedia (MMed); Technology (general) Tech

Dissertations and theses

Arthurs	PS, Comp
Burton	CAI, Ethn
Chirwa	Comp, Alg
Choi	Geom, Comp
Contreras	Comp, Geom
Croft	Att, Tech
Fagbeyiro	Lrnr, Comp
Hall	Comp, Stat
Hayden	CAI
Hooper	CAI, Alg
McMann	Comp, MMed
Mesa	GCal, PS
Mustafa	GCal, Alg
Ou-Yang	Tech, Matl
Risku	Comp, Curr
Rogers	Comp, GCal
Ryan	MMed, Clln
Wang	LD, CAI
Ward	GCal, Mscn
Wilder	Curr, Comp

Articles

Abramovich	PS, Comp, Alg
Adams	Alg, GCal, Assm
Adams	GCal, Alg, Mscn
Andrews	Comp, TKnw
Asiala	Alg, Curr, Comp
Bennett	Assm, PS, Comp
Brandell	Gend, Comp, Att
Brush	Ach, Comp, Grpg
Brush	CAI, Grpg
Clements	PS, CAI, Meas

Cooley	Calc, Comp
Crowe	Comp, Comm
Dubinsky	Comp, Lrng
Elliott	Comp, Tchg, Ethn
Engelbrecht	CAI, Curr
Grassl	Insv, Tech, PS
Lambdin	Prsv, Tech, TAtt
Lee	Mtcg, PS, Comp
Litchfield	CAI, Geom
Nemirovsky	CAI, Vis, Geom
Nguyen-Xuan	Alg, Comp
Nicol	TAtt, Insv, GCal
Piez	PS, GCal, Alg
Ruthven	Cltr, NSns, Att
Ruthven	Cltr, PS
Shaw	Comp, Alg
Shute	Comp, Curr
Simmt	GCal, TAtt, Tech
Simonsen	TAtt, GCal
Stick	Calc, GCal
Tharp	Gcal, TAtt, TBlf
Travis	Vis, CAI, Calc
Waxman	Tech, Anx, Soc
Yelland	Comp, Meas
Yerushalmy	Rep, Alg, Comp

Papers

Astro	Matl, Alg, Comp
Caldwell	GCal, M/CBL, Alg
Crow	Cltr, GCal, Matl
Harris	Matl, Tech, PS
Krantz	PS, Tech
National	Insv, IC, Tech
Rochowicz	AdvM, Comp
White	Alg, Calc, Tech

Grouping for instruction, cooperative learning (Grpg); Planning, decision making (Plan); Teaching (role, style, methods) (Tchg)

Dissertations and theses

Alexander	D/R, Plan
Barbera	Assm, Tchg
Camacho	Tchg, Ethn
Hammill	PS, Grpg
Kristjanson	Tchg, Gend
Lieberman	Tchr, Tchg
Miller	Plan, Curr
Ong	Ach, Grpg
Quinn	Grpg, Gend
Remillard	Matl, Tchg
Rosen	Lrng, Tchg
Slaughter	M/D, Grpg
Slovin	Tchg, Curr
Stimpson	Tchg, TBlf
Uen	Tchg, Lrng
Wolf	Tchg, Prsv
Wyllie	Alg, Tchg

Articles

Adams	Prsv, Tchg, Aff
Anderson	Soc, Tchg
Artz	PS, Grpg, Mtcg
Bauersfeld	Tchg, Revw, Tchr
Boaler	Eqty, Tchg, Gend
Boulton-Lewis	Tchg, Meas
Brown	Alg, Lrng, Tchg
Brown	Lrng, Grpg
Brush	Ach, Comp, Grpg
Brush	CAI, Grpg
Campbell	Tchg, Gend, Eqty
Choi	Tchg, PS, Att
Cobb	Oral, Tchg, ClIn
Conrad	Grpg, Alg
Cunningham	Soc, Tchg
Davis	Tchg, Tchr
DiCintio	Att, Tchg
Driessen	Soc, Tchg
Elliott	Comp, Tchg, Ethn
Fuchs	Tchg, Grpg
Geddis	TKnw, Tchg
Gottschalk	Comm, Tchg, Mtcg
Graham	Tchg, Curr
Gutstein	Ethn, Ach, Tchg
Hunt	Gift, Grpg, Att
Jacobs	TBlf, Tchg, CC
Kamii	Arth, Tchg
Leder	Gend, Soc, Grpg
Lehrer	Soc, Tchg
Leikin	Grpg, ClIn
Lesh	Tchg, Tchr, Grpg
Maccini	LD, Tchg, Revw
Monroe	Tchg, Lang
Morita	Comm, Tchg, ClIn
Naglieri	LD, Plan
Parker	Tchg, Assm, PS
Peled	Tchr, Tchg
Pirie	Tchg
Prawat	TAtt, Curr, Tchg
Raymond	TBlf, Tchg
Robinson	Gift, Tchg
Schmidt	Alg, Tchg, Arth
Steiner	Tchg, Frac
Swafford	Tchg, TKnw
Taverner	Tchg
Taylor	PS, Grpg
Tooke	Tchg, TKnw, Prsv
Verschaffel	Rep, Tchg
Vye	Grpg, PS
Weiss	Tchg, Curr
Wood	Curr, Gend, Plan
Woodward	PS, LD, Tchg
Wyndhamn	PS, Grpg
Zaslavsky	Mscn, Tchg

Papers

A shared	Insv, Plan
Alaska	Plan, Att, IC
Arney	PS, IC, Tchg
Blank	Curr, Assm, Plan
Course	Curr, Plan
Dubinsky	Grpg, Tchg, Revw
Echols	Grpg, IC
Ferrini-Mundy	Curr, Impl, Tchg
Fostering	Insv, Styl, Tchg
Goodman	Comm, Grpg, PS
Harris	Insv, Tchg, Rsch
Hiebert	Impl, Lrng, Tchg
Jenkins	Grpg, Alg, Matl
Mathematics	Tchg, Curr
Moon	Insv, Assm, Grpg
MSEN	Insv, Plan
Question	Curr, Plan
Richardson	ClIn, Curr, Tchg
Ryan	PS, IC, Tchg
Schiro	IC, Tchg, Matl
Stepanek	Curr, Styl, Tchg
Stepanek	Ach, Assm, Tchg
Trentacosta	Eqty, Tchg, Impl

Classroom interaction (ClIn); Communications (Comm); Oral communication, classroom discourse (Oral); Writing, journals (Writ)

Dissertations and theses

Buerger	Writ, PS
Cossey	Comm, Eqty
Dance	Soc, ClIn
Darrow	Curr, Writ
Gregory	Comm, Writ
Heath	Writ, Matl
McCrone	ClIn, Oral
Rowland	Oral, ClIn
Ryan	MMed, ClIn
Sallee	Writ, Frac

Articles

Christiansen	Comm, ClIn
Cobb	Oral, Tchg, ClIn
Crowe	Comp, Comm
Di	Writ, Att
Gottschalk	Comm, Tchg, Mtcg
Leikin	Grpg, ClIn

Lynch	Comm, Assm
Morita	Comm, Tchg, ClIn
Quinn	Writ, TAtt
Sierpinska	Lrng, ClIn, Alg

Papers

Goodman	Comm, Grpg, PS
Johnson	Writ, Assm, Lang
Kestner	Alg, Writ, IC
Monroe	Lang, Oral, Styl
Myers	Comm, IC, Styl
Myers	Comm, IC, PS
Richardson	ClIn, Curr, Tchg
Taylor	Comm, Patt, Writ

Cross-cultural (CC); Equity (Eqty); Ethnic, racial (Ethn); Social factors, context, parents (Soc)

Dissertations and theses

Addington	Ach, Soc
Arnold	Soc, Ach
Ashley	Ethn, TBlf
Balli	Soc
Brown	Ethn, Gend
Burton	CAI, Ethn
Camacho	Tchg, Ethn
Chen	CC, Att
Conger	Curr, Ethn
Cossey	Comm, Eqty
Curtis	Soc, Rep
Cyrus	Ethn, Soc, Blf
Dance	Soc, ClIn
Flory	Ethn, Curr
Harris	Ach, Soc
Jong	Soc, NSns
Kriek	Curr, Soc
Peach	Soc, Ach
Saunders	Ethn, Eqty
Stengel	Gend, Eqty
Swail	Ethn, Curr
Treaster	Soc, Ach
Tsai	Soc, Arth, Knw
Tusgate	CC, Curr
Vincent	Soc, Aff
Walder	Soc, Arth
Washington-Harvey	Ethn, Gend
Weiner	Soc

Articles

Anderson	Soc, Tchg
Berenson	Ethn, Lang, M/D
Birenbaum	Ethn, Assm
Boaler	Eqty, Tchg, Gend
Brookhart	Ach, Soc, Assm
Byrnes	Gend, CC
Cai	CC, Assm
Campbell	Tchg, Gend, Eqty
Carr	Gend, Mtcg, Soc
Chandler	CC, Ach, Assm
Cunningham	Soc, Tchg
DeFranco	M/D, PS, Soc
Dembo	Geom, PS, Ethn
Didion	Eqty, Gend
Driessen	Soc, Tchg
Elliott	Comp, Tchg, Ethn
Elmore	Assm, Ach, CC
FitzSimons	Soc, Gend, Revw
Fleener	Soc, Att
Fouad	Blf, Soc, Rsch
Fuson	Ethn, Curr, PlcV
Ganter	Calc, Soc
Gutstein	Ethn, Ach, Tchg
Harris	Soc, PS, IC
Henningsen	Soc, Att, TAtt
Hoffer	Ach, Soc
Jacobs	TBlf, Tchg, CC
Ladson-Billings	Ach, Ethn, Eqty
Leder	Gend, Soc, Grpg
Lee	Ach, Curr, Eqty
LeFevre	CC, M/D
Lehrer	Soc, Tchg
Leron	Aff, Soc, Lrnr
Lopez	Att, Soc, Aff
Mittelberg	Gend, CC
Morgan	Blf, Ethn
Murtadha-Watts	Ethn, Curr
Pehkonen	Gend, Att, Eqty
Peressini	Curr, Soc, PS
Saminy	Matl, CC
Sawada	Curr, Ethn, PS
Schmidt	Curr, CC, Assm
Signer	Ethn, Gend, Att
Sleeter	Soc, TBlf, Revw
Stacey	Alg, Soc
Streitmatter	Gend, Att, Soc
Tate	Ach, Revw, Soc
Taverner	TAtt, Ethn
Toomey	Blf, Soc
Twale	Lang, Ethn
Valverde	Curr, CC, Ach
Waxman	Tech, Anx, Soc
White	Curr, Eqty
Wilson	M/D, Soc
Yoshida	PS, CC, Knw

Papers

Achievements	CC, Assm, Ach
Achieving	Ach, Impl, CC
Attaining	Impl, CC
Campbell	Assm, Revw, Eqty
Chaplin	Impl, Soc, Curr
Denoya	Eqty, Soc, Att
Denoya	Eqty, Soc, Att
Directory	Eqty, Att
Directory	Eqty, Curr
Dossey	Assm, Curr, CC
Ediger	Eqty, Gend, Impl
Helping	Curr, Impl, Soc
Hinzman	Manp, Soc, Alg
Introduction	CC, Impl, Curr
Kenney	Impl, Ethn, Ach
Mastering	CC, Curr, Impl
Miller-Whitehead	Assm, Eqty
Moderator's	Insv, CC, Impl
Mullis	Ach, Assm, CC
Pursuing	Soc, Ach, CC
Thorson	Matl, Soc
Trentacosta	Eqty, Tchg, Impl
Uncovering	Soc, Matl, IC

Curriculum, programs (Curr); Diagnosis, remedial mathematics (D/R); Integrated curriculum (IC); Manipulatives (Manp); Materials (texts, other resources) (Matl)

Dissertations and theses

Alexander	D/R, Plan
Atkinson	Curr, Tchr
Belongia	Curr
Bills	Alg, Curr
Boggs	D/R, Ach
Burke	Curr
Conger	Curr, Ethn
Cooper	Curr, TAtt
Culbertson	Assm, D/R
Darrow	Curr, Writ
Eilers	PS, IC
Flory	Ethn, Curr
Goldsby	Alg, Manp
Good	IC, Matl
Grant	D/R
Heath	Writ, Matl
Henderson	Curr, TBlf
Hughes	Matl, Assm
Johnson	Alg, Curr
Kriek	Curr, Soc
Lauten	Calc, Curr
Manuse	Curr, Ach
Miller	Plan, Curr
Molinsky	Curr
Newman	Stat, Matl
Nolan	Lang, IC

Ou-Yang	Tech, Matl
Pagliaro	Curr, Lrnr
Peretz	Curr, Ach
Perry	Curr, Lrng
Remillard	Matl, Tchg
Riehs	Curr
Risku	Comp, Curr
Rothschild	Curr
Royer	Curr, TBlf
Salmon	Assm, Curr
Sherin	TKnw, Curr
Slovin	Tchg, Curr
Smid	Curr
Smith	IC, Att
Smith	Assm, Curr
Sottile	Assm, Curr
Spence	Curr, Matl
Swail	Ethn, Curr
Tusgate	CC, Curr
Van	D/R, Ach
Vavra	Alg, D/R
Wilder	Curr, Comp
Wilkins	Curr, PS
Wiltshire	IC, Curr
Wu	Curr, Calc

Articles

Aksu	Frac, Ach, Curr
Allinder	Curr, Assm, D/R
Anku	Assm, PS, Curr
Asiala	Alg, Curr, Comp
Austin	IC, Att, Ach
Belfiore	D/R, M/D
Boaler	Gend, Ach, Curr
Boulton-Lewis	Matl, Rep, Alg
Carroll	Curr, Ach
Cawley	Arth, D/R
Clarke	Matl, TAtt, Tchr
Engelbrecht	CAI, Curr
Fauvel	Curr, Revw
Fouche	Lrng, Alg, Manp
Fuson	Ethn, Curr, PlcV
Graham	Tchg, Curr
Harris	Soc, PS, IC
Hoyles	Prf, Curr
Jardine	Lrng, Matl
Jetty	D/R, Curr
Jitendra	Curr, Assm
Jones	Prob, Curr, Assm
Kendall	Ach, D/R, Gend
Kleinberg	Curr
Knapp	Revw, Curr
Kyle	Revw, Curr
Lawson	Insv, Curr, TBlf
Lee	Ach, Curr, Eqty
Maher	Matl, Alg, Lrng
Mathews	Alg, PS, Curr
Mevarech	Curr, Ach
Murtadha-Watts	Ethn, Curr
Nozade	Matl, Curr
Ostler	Lang, Matl
Peressini	Curr, Soc, PS
Prawat	TAtt, Curr, Tchg
Raghavan	Curr, Geom
Ridgway	Geom, Matl
Ross	Tatt, Curr
Saminy	Matl, CC
Sawada	Curr, Ethn, PS
Schmidt	Curr, CC, Assm
Shaffer	Vis, IC
Shalev	D/R
Shermis	Curr, Rsch, Assm
Shute	Comp, Curr
Skrobarcek	Curr
Smith	IC, Rep
Stevens	Curr, PS
Swann	Curr, TAtt
Ubuz	PS, Matl
Valverde	Curr, CC, Ach
Varelas	NSns, Manp, PlcV
Weiss	Tchg, Curr
White	Curr, Eqty
Wood	Curr, Gend, Plan
Wronkovich	Curr
Yerushalmy	Knw, Manp, Rep

Papers

Alaska	Plan, Att, IC
Arney	PS, IC, Tchg
Astro	Matl, Alg, Comp
Ayers	IC, Insv
Biddulph	Tchr, Matl
Blank	Curr, Assm, Plan
Calhoun	Curr, Rsch, Styl
Chaplin	Impl, Soc, Curr
Course	Curr, Plan
Crosswalks	Curr, Rep, IC
Crow	Assm, IC, Matl
Crow	Cltr, GCal, Matl
Directory	Eqty, Curr
Dossey	Assm, Curr, CC
Echols	Grpg, IC
Ferrini-Mundy	Curr, Impl, Tchg
Harris	Curr, IC, Matl
Harris	Matl, Tech, PS
Helping	Curr, Impl, Soc
Hinzman	Manp, Soc, Alg
House	IC, PS
Hynes	IC, PS
Introduction	CC, Impl, Curr
Jarrett	Curr, Matl
Jenkins	Grpg, Alg, Matl
Kestner	Geom, PS, IC
Kestner	Alg, Writ, IC
Kopp	Manp, Matl, Rep
Lee	Curr, IC, Revw
Local	IC, Insv, TKnw
Malmstrom	AdvM, Matl
Mastering	CC, Curr, Impl
Mathematics	Tchg, Curr
McNeely	Assm, Curr, Impl
Moseley	Alg, Curr
Myers	Comm, IC, Styl
Myers	Comm, IC, PS
National	Insv, IC, Tech
National	Curr, TKnw, Impl
O'Connell	Stat, Matl, Vis
Observation	D/R, Matl
Pickwick	IC, Curr
Primary	Matl, Manp, Curr
Question	Curr, Plan
Richardson	CIln, Curr, Tchg
Ryan	PS, IC, Tchg
Schiro	IC, Tchg, Matl
Schramm	IC, Impl, Lrng
Spadano	Curr, Styl, Tchr
Stepanek	Curr, Styl, Tchg
Stockard	Matl, NSns, IC
Thorson	Matl, Soc
Uncovering	Soc, Matl, IC
University	Curr, Insv, Matl

Discrete mathematics (DscM); Probability (Prob); Statistics (Stat)

Dissertations and theses

Bissey	Prob, PS
Garrison	Prob, Knw
Hall	Comp, Stat
Newman	Stat, Matl
Wilson	Anx, Stat

Articles

Batanero	PS, Prob
Callingham	TKnw, Rep, Stat
Fast	Prob, Mscn
Fischbein	Lrng, Prob
Fischbein	Prob, Mscn
Jones	Prob, Curr, Assm
Tarr	PS, Prob
Wilensky	Stat, Anx, Prob

Papers

O'Connell	Stat, Matl, Vis
Pfenning	Prob, RaPc, Stat

Gender differences (Gend)

Dissertations and theses

Altman	Att, Gend
Armstrong	Gend, Blf
Bonn	Gend, Lrnr
Brown	Ethn, Gend
Kristjanson	Tchg, Gend
Quinn	Grpg, Gend
Stengel	Gend, Eqty
Washington-Harvey	Ethn, Gend

Articles

Bewick	Gend, Att
Boaler	Eqty, Tchg, Gend
Boaler	Gend, Ach, Curr
Brandell	Gend, Comp, Att
Brown	Gend, Att, Blf
Byrnes	Gend, CC
Campbell	Tchg, Gend, Eqty
Carr	Gend, Mtcg, Soc
Casey	Vis, Anx, Gend
Clements	Vis, Gend, Geom
Didion	Eqty, Gend
Duffy	PS, Gend
FitzSimons	Soc, Gend, Revw
Kendall	Ach, D/R, Gend
Leder	Gend, Soc, Grpg
Lord	Gend, Vis
Mittelberg	Gend, CC
Pehkonen	Gend, Att, Eqty
Rennie	Gend, Att, TAtt
Rennie	Gend, TAtt
Signer	Ethn, Gend, Att
Streitmatter	Gend, Att, Soc
Wood	Curr, Gend, Plan
Wulff	Gend, Att

Papers

Bae	Ach, Gend, Revw
Ediger	Eqty, Gend, Impl
Nolan	Att, Blf, Gend

Geometry (Geom); Measurement (Meas); Spatial visualization (Vis)

Dissertations and theses

Choi	Geom, Comp
Contreras	Comp, Geom
Moody	Geom, Assm

Articles

Aspinwall	Calc, Vis, Lrng
Boulton-Lewis	Tchg, Meas
Brown	PS, Lrng, Vis
Casey	Vis, Anx, Gend
Clements	PS, CAI, Meas
Clements	Vis, Gend, Geom
Dembo	Geom, PS, Ethn
Hasegawa	Geom, Lrng
Litchfield	CAI, Geom
Lord	Gend, Vis
Mariotti	Geom, PS
Nemirovsky	CAI, Vis, Geom
Noss	Rep, Vis, Lrng
Raghavan	Curr, Geom
Raymond	Att, Rsch, Vis
Ridgway	Geom, Matl
Shaffer	Vis, IC
Travis	Vis, CAI, Calc
Yelland	Comp, Meas

Papers

Kestner	Geom, PS, IC
O'Connell	Stat, Matl, Vis

Gifted (students) (Gift); Knowledge (student's) (Knw); Learners (characteristics of) (Lrnr); Learning disabled (LD); Learning style, cognitive style (Styl); Misconceptions (Mscn)

Dissertations and theses

Bass	Styl, Mscn
Bonn	Gend, Lrnr
Caldwell	Aff, Lrnr
Case	LD, Lrng
Fagbeyiro	Lrnr, Comp
Garrison	Prob, Knw
Gupta	Patt, Mscn
Lambert	LD, PS
Le	Lrnr, Styl
Montis	LD, Lrng
Pagliaro	Curr, Lrnr
Ruiz	Alg, Mscn
Selitto	Alg, Mscn
Tsai	Soc, Arth, Knw
Wang	LD, CAI
Ward	GCal, Mscn
Webb	Styl

Articles

Adams	GCal, Alg, Mscn
Bessant	PS, Mtcg, Styl
Carlson	Alg, Knw
Deblois	Styl, NSns
Demby	Styl, Alg
Evensky	Ach, Knw, Lrng
Fast	Prob, Mscn
Fischbein	Prob, Mscn
Fuchs	Ach, LD
Gay	NSns, RaPc, Knw
Graham	PS, Lrnr
Hunt	Gift, Grpg, Att
Leron	Aff, Soc, Lrnr
Maccini	LD, Tchg, Revw
Mevarech	Mscn, Rep
Meyer	Att, Lrnr
Moloney	Frac, Mscn
Mulligan	PS, Knw, M/D
Naglieri	LD, Plan
Nakahara	Lrng, Knw
Peled	Anx, Lrnr
Power	Arth, Mscn
Robinson	Gift, Tchg
Slate	Ach, LD
Woodward	PS, LD, Tchg
Yerushalmy	Knw, Manp, Rep
Yoshida	PS, CC, Knw
Zaslavsky	Mscn, Tchg
Zazkis	Alg, Knw

Papers

Calhoun	Curr, Rsch, Styl
Fostering	Insv, Styl, Tchg
Monroe	Lang, Oral, Styl
Myers	Comm, IC, Styl
Spadano	Curr, Styl, Tchr
Stepanek	Curr, Styl, Tchg

Implications of research, interpretations of research (Impl); Research issues, methods (Rsch); Reviews of research (Revw)

Articles

Bauersfeld	Tchg, Revw, Tchr
Fauvel	Curr, Revw
FitzSimons	Soc, Gend, Revw
Fouad	Blf, Soc, Rsch
Knapp	Revw, Curr
Kupermintz	Ach, Rsch
Kyle	Revw, Curr
Ma	Revw, Att, Ach
Maccini	LD, Tchg, Revw
Onwuegbuzie	Anx, Rsch
Raymond	Att, Rsch, Vis
Shermis	Curr, Rsch, Assm
Sleeter	Soc, TBlf, Revw
Tate	Ach, Revw, Soc

Papers

Achieving	Ach, Impl, CC
Allen	Assm, Impl

Attaining	Impl. CC
Bae	Ach. Gend. Revw
Calhoun	Curr. Rsch. Styl
Campbell	Assm. Revw. Eqty
Chaplin	Impl. Soc. Curr
Doig	Impl. Assm
Dubinsky	Grpg. Tchg. Revw
Ediger	Eqty. Gend. Impl
Ferrini-Mundy	Curr. Impl. Tchg
Harris	Insv. Tchg. Rsch
Helping	Curr. Impl. Soc
Hiebert	Impl. Lrng. Tchg
Introduction	CC. Impl. Curr
Kenney	Impl. Ethn. Ach
Lee	Curr. IC. Revw
Mastering	CC. Curr. Impl
McNeely	Assm. Curr. Impl
Moderator's	Insv. CC. Impl
National	Curr. TKnw. Impl
Schramm	IC. Impl. Lrng
Trentacosta	Eqty. Tchg. Impl

Inservice teacher education, professional development (Insv); Preservice teacher education (Prsv)

Dissertations and theses

Benson	Assm. Insv
Henriques	TBlf. Prsv
Kang	TBlf. Prsv
Wolf	Tchg. Prsv

Articles

Adams	Prsv. Tchg. Aff
Barak	TKnw. Insv
Behr	Prsv. Frac. TKnw
Grassl	Insv. Tech. PS
Kaminski	NSns. Prsv
Lambdin	Prsv. Tech. TAtt
Lawson	Insv. Curr. TBlf
Naizer	Assm. Prsv
Nicol	TAtt. Insv. GCal
Schuck	TBlf. Prsv
Tooke	Tchg. TKnw. Prsv
Verschaffel	TKnw. PS. Prsv

Papers

A shared	Insv. Plan
Ayers	IC. Insv
Fostering	Insv. Styl. Tchg
Harris	Insv. Tchg. Rsch
Local	IC. Insv. TKnw
Moderator's	Insv. CC. Impl
Moon	Insv. Assm. Grpg
MSEN	Insv. Plan
National	Insv. IC. Tech
University	Curr. Insv. Matl

Language, psycholinguistics (Lang); Representations, modeling (Rep)

Dissertations and theses

Alidou	Lang. Ach
Curtis	Soc. Rep
Howard	PS. Rep
Irwin	Decm. Rep
Keck	Assm. Rep
Lin	PS. Lang
Nolan	Lang. IC

Articles

Berenson	Ethn. Lang. M/D
Boulton-Lewis	Matl. Rep. Alg
Brenner	Alg. Lrng. Rep
Callingham	TKnw. Rep. Stat
Chapman	Lang. Lrng
Mevarech	Mscn. Rep
Monroe	Tchg. Lang
Noss	Rep. Vis. Lrng
Ostler	Lang. Matl
Smith	IC. Rep
Smith	Rep. Lrng
Towse	Lrng. Lang. NSns
Twale	Lang. Ethn
Verschaffel	Rep. Tchg
Yerushalmy	Knw. Manp. Rep
Yerushalmy	Rep. Alg. Comp

Papers

Crosswalks	Curr. Rep. IC
Johnson	Writ. Assm. Lang
Kopp	Manp. Matl. Rep
Monroe	Lang. Oral. Styl

Learning, learning theories, cognitive development (Lrng); Philosophy, epistemology (Phil)

Dissertations and theses

Bosch	RaPc. Phil
Case	LD. Lrng
Coulombe	Alg. Lrng
Ford	Alg. Lrng
Kelleher	NSns. Lrng
Lobato	Lrng. Alg
Meyer	Calc. Lrng
Montis	LD. Lrng
Perry	Curr. Lrng
Robins	Lrng. PS
Rosen	Lrng. Tchg
Shew	Blf. Lrng
Siadat	Phil
Snook	Lrng. Calc
Uen	Tchg. Lrng
Whalen	Lrng. Arth
Zolkower	Phil. Lrng

Articles

Arsac	PS. Lrng. Mtcg
Asiala	Lrng. Calc
Aspinwall	Calc. Vis. Lrng
Brenner	Alg. Lrng. Rep
Brown	Alg. Lrng. Tchg
Brown	Lrng. Grpg
Brown	PS. Lrng. Vis
Ca[illegible]	PS. Lrng
Chapman	Lang. Lrng
Clark	Lrng. Calc
d'Ailly	PS. Lrng
Dahlberg	Lrng. Ach
Dubinsky	Comp. Lrng
Evensky	Ach. Knw. Lrng
Fischbein	Lrng. Prob
Fouche	Lrng. Alg. Manp
Gal-Ezer	Alg. Lrng
Hasegawa	Geom. Lrng
Jardine	Lrng. Matl
Kiefer	M/D. Lrng
Leung	Lrng. Alg
MacGregor	Alg. Lrng
Maher	Matl. Alg. Lrng
Morrison	Lrng
Mukhopadhyay	Lrng. Arth. Nsns
Mura	NSns. Lrng. Calc
Nakahara	Lrng. Knw
Noss	Rep. Vis. Lrng
Nunokawa	Lrng. PS
Sierpinska	Lrng. Clln. Alg
Smith	Rep. Lrng
Sophian	Frac. Lrng
Suggate	NSns. Lrng
Towse	Lrng. Lang. NSns

Papers

Hiebert	Impl. Lrng. Tchg
Schoenfeld	Calc. Assm. Lrng
Schramm	IC. Impl. Lrng

Metacognition (Mtcg); Patterns, relationships, math connections (Patt); Problem solving, reasoning (PS); Proof, justification (Prf)

Dissertations and theses

Arthurs	PS, Comp
Beauford	Mtcg, Alg
Bissey	Prob, PS
Buerger	Writ, PS
Eilers	PS, IC
Forbes	Calc, PS
Gupta	Patt, Mscn
Hammill	PS, Grpg
Howard	PS, Rep
Lambert	LD, PS
Lin	PS, Lang
Mesa	GCal, PS
Robins	Lrng, PS
Saeed	Prf, Att
Sanchez	Calc, PS
Schneider	Aff, PS
Wilkins	Curr, PS

Articles

Abramovich	PS, Comp, Alg
Anku	Assm, PS, Curr
Arsac	PS, Lrng, Mtcg
Artz	PS, Grpg, Mtcg
Artz	PS, Grpg, Mtcg
Batanero	PS, Prob
Bennett	Assm, PS, Comp
Bennett	PS, Assm
Bessant	PS, Mtcg, Styl
Brown	PS, Lrng, Vis
Carr	Gend, Mtcg, Soc
Carroll	PS, Lrng
Chapman	PS, TKnw
Choi	Tchg, PS, Att
Clements	PS, CAI, Meas
d'Ailly	PS, Lrng
DeFranco	M/D, PS, Soc
Dembo	Geom, PS, Ethn
Duffy	PS, Gend
English	PS, NSns
Falk	PS
Franke	Blf, PS
Gottschalk	Comm, Tchg, Mtcg
Graham	PS, Lrnr
Grassl	Insv, Tech, PS
Harris	Soc, PS, IC
Hoyles	Prf, Curr
Koyama	Mtcg
Lee	Mtcg, PS, Comp
Leung	Arth, PS, TKnw
Lucangeli	Mtcg, PS
Mariotti	Geom, PS
Mathews	Alg, PS, Curr
Mulligan	PS, Knw, M/D
Nunokawa	Lrng, PS
Nunokawa	PS
Pajares	Assm, Att, PS
Parker	Tchg, Assm, PS
Peressini	Curr, Soc, PS
Piez	PS, GCal, Alg
Ricco	Prf
Ruthven	Cltr, PS
Sawada	Curr, Ethn, PS
Stevens	Curr, PS
Tarr	PS, Prob
Taylor	PS, Grpg
Ubuz	PS, Matl
VanLeuvan	Mtcg
Verschaffel	TKnw, PS, Prsv
Vye	Grpg, PS
Wood	Ach, PS
Woodward	PS, LD, Tchg
Wyndhamn	PS, Grpg
Yoshida	PS, CC, Knw

Papers

Arney	PS, IC, Tchg
Goodman	Comm, Grpg, PS
Harris	Matl, Tech, PS
House	IC, PS
Hynes	IC, PS
Kestner	Geom, PS, IC
Krantz	PS, Tech
Myers	Comm, IC, PS
Ryan	PS, IC, Tchg
Taylor	Comm, Patt, Writ